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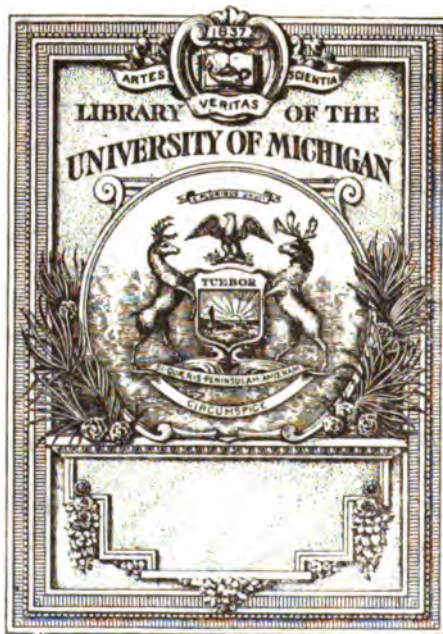
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EDITED BY  
BROOKS H. WELLS, M. D.  
GEORGE W. KOSMAK, M. D.

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BROOKS H. WELLS, M. D.  
GEORGE W. KOSMAK, M. D.



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**VOLUME LXXV.**

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**ORIGINAL COMMUNICATIONS.**

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**TRANSACTIONS OF THE  
AMERICAN ASSOCIATION OF OBSTETRI-  
CIANS AND GYNECOLOGISTS.**

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*Proceedings of the Twenty-ninth Annual Meeting held at  
Indianapolis, Ind., September 25, 26 and 27, 1916.*

*The President, HUGO O. PANTZER, M. D., in the Chair.*

**FIBROMYOMATA UTERI AND CARDIOVASCULAR\*  
DISEASE.**

**BY**

**BEN. R. McCLELLAN, M. D.,**

**Xenia, Ohio.**

THE frequent concurrence of fibromyomata and cardiovascular changes together with the fact, repeatedly observed, that the cardiovascular difficulty was usually modified and often entirely relieved following operative intervention for the removal of the fibromyomata, as well as the startling fact that in each case terminating unfavorably the bad result was directly due to the advanced condition of the cardiovascular complication, led the writer to investigate the possible etiological relationship of the two distinct pathological conditions.

Practically nothing is found in text-books concerning this subject, and one must search in gynecological literature for allusions to this condition and for opinions upon its cause.

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

A search of the available literature revealed the fact that many other surgeons had had similar experience to my own, and that not a few had evolved theories to explain a causative relationship of these conditions. It is the purpose of this paper to review some of this literature and to report some recent personal experiences, with the hope that the discussion of the subject will awaken renewed interest, and will possibly bring about a clearer understanding of this interesting and as yet unsettled question.

According to Jaschke(1), it was Kasprczik at Hegar's clinic, who, in 1881, first called attention to the coincidence of heart disease and myoma. His case was one of supravaginal hysterectomy for myoma uteri, which, on postmortem examination, showed nothing but "paralysis of the heart." In 1883 Rose called attention to the fact that in cases of slow growing myomata secondary degeneration and atrophy of the heart muscle occur, which is often the cause of death following the operation for the removal of such tumors. Rose was decidedly of the opinion that the tumor was the direct cause of the heart complication. In 1884, Sanger, Henning, and Durer all reported similar cases. These authorities explained the cause of death after myoma operations as being due to pulmonary emboli, but that a cardiac degeneration was the cause of the emboli.

In the same year, Hofmeier(2), in the clinic of Schroeder, reported eleven cases of death following the removal of abdominal tumors, most of which, it is fair to presume, were myomas, in which the autopsy revealed the cause due to fatty degeneration and brown atrophy of the myocardium. In his report Hofmeier was inclined to the belief that anemia and general debility, usual in such patients, are the real causes of the heart complications. It, therefore, logically followed that many gynecologists came to the conclusion that the first sign of myocardial change should be an indication for immediate operation in myoma cases. The importance of the circulatory apparatus as a prognostic factor was thus established.

Landau was of the opinion that the prolonged administration of ergot for the cure of fibroids would produce the same change in the heart and blood-vessels as it would in the uterus, that is, hyaline thrombi, and he reported two such deaths in thirty operations for fibromyomata. According to Jaschke, similar cases and contributions to this subject were published in 1890 by Russel and Kyargaard, in 1893 by Runge, and in 1895 by Katchan Bazor.

In 1889, Kisch(3) emphasized the role of anemia in the production of myodegeneration of the heart in connection with fibroid of the uterus.

In 1898, Strassman and Lehman(4) published an exhaustive résumé of the entire question of so-called "myoma heart" in which they stated that 40.8 per cent. of all their cases (seventy-one) gave either subjective or objective evidence of heart involvement. They also advanced the unique theory that such heart and blood-vessel changes were the evidence of advanced myomatous disease, and that the two diseases have a common etiology, namely, in the vasomotor system. They reasoned that if the cardiovascular disease is only secondary to the myoma in the uterus, that the symptoms caused directly by the tumor should precede those of abnormal cardiac conditions; but, believing that this was not the case, they concluded that the heart degeneration and the myoma are due to one and the same cause.

In 1900, Wilson(5) found that in 274 cases of myoma, 46 per cent. showed heart complications. Other causes than the presence of the myoma uteri were found to account for some of the cases, while in others they could be accounted for only by the presence of the tumor. In his opinion, the heart complications seemed to be due to long standing anemia, resulting in a disturbed nutrition of the myocardium. In 1901, Buckhard pointed out the fact that thrombosis and embolism followed myoma operations more than they did other surgical procedures, and he thought that this was due to the heart and blood changes which are so often present in these cases.

In 1904, Fleck(6) found in 325 myoma cases at the Göttingen clinic that 40.9 per cent. of them showed heart complications. In these figures are included all cases exhibiting any deviation from normal, and Fleck insisted that such heart complications should only be considered when they produced distinct disturbances of the heart functions. He declared that "heart disease with myoma is characterized clinically by a relative insufficiency. The heart complication resembles a myocarditis, but is not identical with it." He also made pathological examinations which seemed to demonstrate that brown atrophy of the heart muscle is characteristic of fibroids without hemorrhage, and that fatty degeneration of the myocardium is associated when severe bleeding accompanies the growth. Further, he stated that the relation between myoma uteri and heart disease is explained by abnormalities in metabolism, perhaps in a hyperfunction of the ovaries, as has been pointed out by other writers.

In 1905, Winter(7, 8) made an exhaustive and critical review of the literature pertaining to this entire subject, from which he deduces

the following: that many reported cases cannot be said to be produced solely by the fibroid. For example, in thirty-two cases reported in the literature, only five could be said to be due to the myoma, and in fifty-two of his own cases which came to autopsy, there were twenty-five which showed macroscopic heart changes, and of these only seven had no other explanation. Winter thinks that although there are too few cases which have been proven microscopically, the examinations by experienced clinicians in myoma patients must be given credence. In his clinic there were 266 cases in which the heart examination was minutely made. It was found that 60 per cent. gave a myoma heart, 30 per cent. had heart murmurs, mostly anemic in character, 6 per cent. had dilatation or hypertrophy, and 1 per cent. had changes in the myocardium.

In answer to the query, whether heart complications are influenced or cured by the myoma operations, Winter states that dilatation of the heart and myocardial degenerations due to hemorrhage or anemia are favorably influenced by the removal of the myoma. He insists that an etiological relationship between myoma and heart disease has not been proven, and that the heart is influenced solely by the secondary anemia which is due to the hemorrhage, which in turn is due to the myoma.

In the same year, von Lingen(9) reported sixty-six cases which were studied clinically, from which he came to the conclusion that although the actual relationship of heart disease to myoma has not been demonstrated, yet we can speak of a characteristic condition known as "myoma heart," and that its existence is an indication for early operation in such patients. Engleman also reviewed a large series of cases at Kreuznach, and speaks against the idea of a myoma heart. Schlaegle studied the autopsy findings of eighty cases of myoma which showed changes in the heart in fifty-five cases (68.5 per cent.). He is, therefore, of the opinion that there is a definite relationship between myoma and heart disease.

In the same year, Cumston(10) made a very exhaustive review of the subject, from which he concludes that the heart complications are not easily explained. He attaches considerable importance to the mechanical influence, especially on the kidneys, and (in cases of very large tumors) compression of the lungs, as well as the influence due to anemia secondary to hemorrhage, all of which he thinks are important etiological factors.

Another valuable contribution to the literature of this subject was made by Boldt(11) in the same year, who, after a generous review of the literature, says that he agrees with Winter in many of his deduc-



tions, and that in his own autopsies in these cases some degenerative changes were always found in the heart muscle, whether previously diagnosed or not, and whether or not the neoplasm had given rise to metrorrhagia or menorrhagia. Boldt further states that no particular form of cardiac degeneration is distinctly attributable to myomata, but we know the general pathological conditions of the heart, blood-vessels, and kidneys associated with myofibromata, and that clinical experience teaches that patients with myomata have a weak heart, and that this leads to venous thrombosis, especially of the femoral and pelvic veins, and these in turn lead to pulmonary embolism.

In 1905, Deaver<sup>(12)</sup> observed that "great frequency of myocarditis and arteriosclerosis is well known, and to sudden heart failure, to pulmonary embolism, or to apoplexy, may no doubt be attributed many a postoperative death occurring at the beginning of an apparently normal convalescence. The average duration of life after operation in nineteen fatal cases in my list has been five and one-half days, and while some of these deaths may be attributed to shock and exhaustion, and a few to peritonitis, yet I am convinced that in a number death was caused by preëxisting cardiac and cardiovascular disease."

Heywood Smith is quoted as explaining the cardiac hypertrophy so often found in fibroids to be due to the heart having to overcome the increased resistance caused by the extended area of circulation produced in the tumor, as well as the resistance through tissue so unyielding as a fibroid tumor.

Thalheim, Rostrom, and Lenhartz offer a unique theory to explain the cardiovascular complications on a chemical basis as a toxemia (similar to that found in Basedow's disease) from muscle extracts released from the tumor, and ask the question, "Is it possible that the tumor continually produces some form of internal secretion which may be toxic in character, and in cases of degenerating fibroids does the disintegration of protein material produce a poison capable of affecting distant organs?"

Neu<sup>(13)</sup> suggests that the thyroid gland itself may furnish the explanation of the heart symptoms.

Webster<sup>(14)</sup> calls attention to the fact that renal disturbances are more common in myoma uteri than is generally believed. In 30 per cent. of his cases one or more of the following conditions were noted: deficient amount of urine or urea, albumin, and casts, with edema of the feet, and he believes that the factors concerned in the production of these renal disturbances are probably identical with those causing the cardiac changes.

In 1909, Kelly and Cullen(15) state that their experience coincides with that of Leopold, namely, that cardiac changes in this class of cases are usually functional, and the direct result of anemia caused by uterine hemorrhage.

In 1911, Patta and Decio(16) reported an interesting investigation in which extracts taken from myomatous growths were given to lower animals. As a result of these injections, these authors report a disturbance of the pulse, with lowered blood pressure; the pulse, as a rule, became slower, then more rapid, alternating in this manner for periods of from five to thirty minutes; at no time was there an increase of the blood pressure.

In 1912, Hall(17) estimated the frequency of the association of heart disease and myoma as 40 per cent. in late cases, and claimed this percentage to be all out of proportion compared with a like number of other surgical risks, excepting goiter, and said that although the exact relation of the two diseases has not been determined, the heart complications are to be regarded as a serious handicap to these patients. Hall recommended early intervention in myoma cases.

Healy(18) found that heart murmurs were four times more frequent in women with myoma than in average women without myoma.

In 1912, Doane(19) made a very careful study of this subject, and concludes that, although hemorrhages are frequent in a majority of the cases, yet as a prime factor in the cause of the heart complications it is to be excluded because the same symptoms appear in myomatous women who give no history of bleeding. Doane thinks that the cardiac changes are due to toxins developed during the growth of the tumor. He reports four cases of marked improvement in the cardiac condition after successful removal of the fibroid.

In 1913 Herz(20) endeavors to show a similar etiology for so-called "goiter heart," "myoma heart," and the heart symptoms of the climacteric, claiming that the symptoms of each are identical. He gives a common cause for the cardiac symptoms in these diseases, namely, disturbed internal secretions.

In 1914 Mahler(21) says that it is his opinion that the heart changes in myoma patients are due to hemorrhage in connection with abnormal ovarian secretion. He reports cases of improvement in the heart condition by deep x-ray therapy, claiming that in this way he has influenced the ovarian secretions, and thereby caused an improvement in the cardiac symptoms.

In 1914 McGlinn(22), in a most carefully prepared article, re-

views the literature on the subject. He also reports the findings in a series of 244 postmortem examinations on myomatous patients in whom he seems to prove conclusively that a myoma heart due entirely and solely to the presence of the tumor does not exist; that all the heart changes which are usually found are due to so-called accidents of the tumor; that so far the weight of evidence points against the view that there are characteristic cardiac changes in myoma uteri.

Since our attention has been directed to this interesting question, we have had opportunity to carefully study twenty-six cases of fibromyoma uteri, nine of which had well-marked cardiovascular complications. In each case the diagnosis of the latter condition was confirmed by a competent internist. Of the nine, only two gave any history of other adequate cause than the presence of the fibroid uterus; these two gave distinct histories of previous acute pelvic infections. Two of the nine patients died, one within a few hours following a difficult removal of a very large multiple fibroid of many years growth, which had undergone cystic degeneration, and was complicated by very extensive adhesions to the surrounding viscera. The heart behaved badly during the operation, and death was undoubtedly due to shock, which in turn was caused by extreme traumatism in the presence of a heart and blood-vessels already handicapped by changes due to the presence of the chronic uterine disease. The other case, which had very pronounced cardiac and renal complications, was carefully prepared for the operation which was not difficult, although the tumor was of extreme size. The patient made an exceptionally good recovery up to the eleventh day, but died without warning, while sleeping after a dinner which she had greatly enjoyed. No doubt the cause of death was brown atrophy of the heart. Unhappily, in neither of these cases could an autopsy be secured, but both physical examination and the clinical history were enough to thoroughly establish the fact of serious cardiovascular changes. The remaining seven cases have all recovered with symptomatic relief from cardiac trouble, and only three, on careful physical examination, show some hypertrophy.

That a relationship between the two diseases exists there can scarcely be any doubt; but the etiology of the cardiovascular changes remains as yet in the field of theory, as is evident from the following brief summary of suggested causes.

(a) Anemia due to hemorrhage the result of fibromyomata uteri.

(b) A common cause of the two conditions, namely, a fibrosis in the muscularis of the blood-vessels.

(c) A hyaline degeneration of the blood-vessels due to enlargement of the ovaries.

(d) Pressure of tumor on large abdominal vessels.

(e) Increased resistance to circulation caused by the extended area of circulation produced by the tumor as well as by the resistance through a tissue so unyielding as a fibroid tumor.

(f) Interference with the freedom of heart and lung action.

(g) Interference with the alimentary function whereby nutrition being impaired toxic matter is absorbed from the bowels.

(h) Pressure on the kidneys, ureters, or renal vessels.

(i) Irritation of the cerebrospinal or sympathetic nervous apparatus, especially the large abdominal ganglionic masses belonging to the latter system.

(j) A common cause due to changes in the vasomotor system.

(k) Abnormalities of metabolism due to hyperfunction of the ovaries.

(l) A chemical basis, as a toxemia from muscle extracts released from the tumor.

The writer strongly favors this last theory because of, *first*, the similarity in cardiac disturbance in goiter and fibromyoma uteri; *second*, the experiments of Patta and Decio referred to above, show a direct influence of the muscle extract upon the heart; and, *third*, because of the testimony of many anesthetists to the fact that the heart is more disturbed in myomectomies than in other operations of equal severity, except in thyroidectomies, and this always in proportion to the amount of traumatism to the neoplasm.

If the following suggestion of Boldt is generally adopted it will not be a very long time until a final and definite solution of this interesting question will be determined, namely: "The only proper and scientific method of getting at the exact relation between myomata and the heart and other internal organs is to have a competent diagnostician in internal medicine make a careful examination of each patient having myofibroma, and further, to have the same diagnostician examine the patient from time to time subsequent to the operation if one has been performed for the removal of the tumor, and if the neoplasm was supposed to have given rise to changes in the internal organs. Further changes should be carefully noted, and if the lesions were caused by the tumor, then some improvement, if not a complete cure, must be determined in the course of time. In case of death, it is not enough to make a macroscopical examination at the postmortem, but careful microscopical examination should be made of the heart and blood-vessels, kidneys, etc."

Finally, it seems to the writer that the practical lessons of interest to the general practitioner and the surgeon are, *first*, a recognition of the concurrence of the two pathological conditions. Therefore, the general practitioner should be alert to recognize the myomatous condition and not be content to persistently treat the heart condition alone, but rather aim to discover the former and advise early operation. *Second*, the surgeon should work hand in hand with the internist; each patient with myoma should be suspected of having cardiac complications and careful examination be made by a competent diagnostician of the heart, kidneys, etc. The patient should be given careful hygienic treatment, especially as to diet and exercise, and the tumor should be removed unless the cardiac and renal conditions are so far advanced as to forbid operative interference. If hemoglobin is materially reduced, an intravenous infusion should be given at the beginning of the operation. Careful cardiac tonics should not only be given during the period of preparation, but for a considerable time after the operation.

7 EAST SECOND STREET.

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## DISCUSSION.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—We owe Dr. McClellan a debt for having reviewed the literature and brought to our attention this important subject.

For some time it has been generally known among clinical observers that a relation existed between the heart and fibroids, and with Winter, we are forced to say that some credence must be given to those clinicians who have observed the coexistence of myocardial degeneration and myoma. The question is of special importance at this time on account of the problems relating to the indications for operation. There is a tendency to treat these myomas with the x-ray and get away from operative treatment.

Is there an internal secretion from such tumors? There seems to be some evidence to warrant that assumption. In passing I wish to call attention to the fact that we do not know very much about internal secretions in glands like the thyroid, the adrenals and other ductless glands. We can say the same thing regarding myoma, internal secretions, and heart complications. Whether brown atrophy of the heart muscle is due to a toxic influence from the myoma, or whether myocardial fatty degeneration is due to anemia and hemorrhage we cannot say exactly. If there are myocardial changes due to toxic influences it emphasizes the need of early operation and such heart complications should exclude the x-ray and other therapies than surgical.

DR. R. R. HUGGINS, Pittsburgh, Pa.—One of the important object lessons to be drawn from a discussion of this kind is the responsibility of the surgeon himself. We have not reached the time when the report of the internist offers as much help in this class of cases as could be hoped for, because he cannot know how hard the drive may be to which the patient is subjected by the surgeon. The paper read yesterday by Dr. Moots was important in that it showed the advantages from careful study of pulse pressure during operation. We have employed it in the preliminary study of our cases and have derived much satisfaction from it in patients where there is marked evidence of myocardial disease such as under discussion. Careful observation of the pulse pressure is made while resting and after exercise. If the pulse pressure is low in bed and if after exercise the systolic and diastolic pressures approach each other to a marked extent it is a good indication that the patient is a poor risk. We feel sure that a careful study of the pulse pressure will bring us near the goal in the final estimate of vital resistance in handicapped patients.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I want to call attention to one thing we sometimes overlook. The more we investigate these various heart troubles, the more we are finding that a great many of these cases are due to syphilis. We have no idea how many cases of syphilis there are. I have spoken on this subject so frequently and emphasized it so vigorously that sometimes my fellow practitioners say that I have it on the brain. But they find out there is a great deal of syphilis, a great deal more than any



one has an idea of. If you have a patient with heart complication, you had better look out for syphilis.

Dr. Warthin, of Ann Arbor, has demonstrated syphilis in the heart muscle in a number of cases. He has demonstrated conclusively the spirochetes in the heart muscles of patients who were considered cured of syphilis, and who manifested no symptoms of it whatever. However, on postmortem examination he has found spirochetes in the heart muscle. It shows that when we have heart trouble complicating fibroid tumors or any other pathological condition, we must look out for syphilis.

Let me say a word or two more about syphilis. I have the blood of these patients examined by the Wassermann test and the pathologist reports them negative. He says the Wassermann test is absolutely negative. Personally, I pay very little or no attention to that, and I have found syphilis just the same whether the Wassermann test was negative or not. The Wassermann test is not absolutely reliable. I have seen patients who gave a negative Wassermann test, and yet they had syphilis. Even if the pathologist tells you that the Wassermann test is negative, you may find other evidences of syphilis, and if you will give such patients mercurial treatment, the iodides and salvarsan, you will find they will recover or at least wonderfully improve. A little alcohol, a little anesthetic, and a lot of other things we do not know much about at present will negative the Wassermann reaction, so I say do not pay too much attention to it. I call your attention to this particular point because we are so liable to overlook syphilis. I have overlooked it myself. The other day I had a case in which I did not have the remotest idea the patient could be syphilitic, but after an operation I discovered that he was.

DR. JAMES E. DAVIS, Detroit, Michigan.—What Dr. Carstens has said in regard to the work of Dr. Warthin is very true. However, it does not seem to me that it applies specifically to the paper before us this morning, excepting as it might rule out quite a large percentage of cases that have directly been attributed to the effects of the myoma, in producing cardiac degenerative changes.

I want to call attention to one or two points which will help one somewhat in understanding some of the theories from the standpoint of physiology and pathology.

The unit of organization is the single cell. When we have an aggregation of cells, then the exigency of function arises. With the establishment of function canalization must be provided for, and in most all of the structures of the body we have canalization that carries the secretion from the tissue. The aggregation of cells makes the tissue, and canalization is to carry the secretion from the tissue. A single cell must functionate as a unit, or it has an internal secretion which does all its work. There is no canalization at all to the outside, that is unnecessary. The point I wish to make in connection with the paper is this, that in the formation of myomata we have muscle cells reduced to a lower or simpler form. The ordinary muscle cell is exceeded in size and the new-formed cell is larger in a myoma, and in this reduced type of cell, this degraded cell, we have

a return to the primitive organization of the single cell, with no essential canalization. No lymph channels are formed with this early cell or with this aggregation of early cells, so we evidently must have an internal secretion in these newly formed myomatous cells. It seems quite logical to suppose that with these excretions or secretions of the newly formed cells thrown into the circulatory system, the blood system first, for we find in the new growths the formation of new blood-vessels much before the formation of the lymph-vessels, hence the ferment is thrown directly into the circulatory system, therefore, with the heart as a part of the muscular and circulatory systems we ought to have primary or at least secondary catabolizing effects upon the heart.

DR. BEN R. McCLELLAN (closing).—I have nothing further to add, except the request that surgeons and anesthetists keep careful notes as to the behavior of the heart during myoma operations, in order to verify the observation already made, that the heart is disturbed more seriously in these operations than in any other, excepting thyroidectomies, and always in proportion to the amount of traumatism produced in the course of the operation.

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### PROLAPSE OF THE UTERUS IN NULLIPAROUS WOMEN.\*

BY

PALMER FINDLEY, M. D., F. A. C. S.,

Omaha, Nebraska.

Two cases of prolapsus uteri in women who have borne no children have come under my observation and serve as a basis for the consideration of prolapse of the uterus in nulliparous women. It is the most common of all lesions in the pelvis of multiparous women and one of the rarest of lesions in the nulliparous. Weinberg finds prolapse of the uterus in the new-born and in nulliparous women to constitute 3.45 per cent. of all cases of prolapsus, while Scanzoni would place the percentage at 13.15.

Virginal prolapse of the uterus occurs with greatest frequency in the new-born and in most instances there are associated congenital defects; notably spina bifida. Schaeffer reports the case of a fetus of the second half of intrauterine development, in which the uterus and vaginal walls were prolapsed and there was a well-marked spina bifida.

Procidentia in the new-born is rarely in evidence at the time of birth, but develops, as a rule, in the following week. Such infants rarely mature; death resulting from associated lesions rather than

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from the procidentia. The frequency with which spina bifida is associated with procidentia in the new-born is approximately 86 per cent. Nebesky records twenty cases, seventeen of which were associated with spina bifida and von Radwauksi fourteen cases with spina bifida in twelve. If, however, we were to include the cases of spina bifida occulta, a lesion commonly overlooked, the percentage would be much higher. It is of peculiar interest to note the observations of Ebeler who rayed twenty-eight multiparous women with prolapsus uteri and found occult spina bifida in twenty-three (82.14 per cent.). Later twenty-eight multiparous women without prolapsus were rayed and three of this number revealed occult spina bifida. Ebeler argues, with much reason, that neural disturbances with secondary muscular insufficiency of the pelvic floor is an important factor in the development of procidentia in multiparæ as well as in nulliparæ.

Associated with spina bifida and prolapsus uteri in the new-born are numerous congenital defects; *i.e.*, hydrocephalus, ankle clonus, club feet, scoliosis, kyphosis, flat or perpendicular pelvis, infantile uterus, flat and shallow vagina, elongated cervix, prolapse of rectum, inguinal hernia, paresis of perineal muscles and disturbed sensation in the lower extremities.

The relation of spina bifida to prolapsus uteri has been variously interpreted. Krause, together with many who have expressed an opinion, advances the theory of faulty innervation of the supporting structures in general; Ertzbischoff, to faulty innervation of the uterine ligaments alone; Haussen, to disturbances in the central nervous system, while Halban and Burger and the majority of writers on the subject account for the prolapsus on the theory of faulty innervation of the muscles of the pelvic floor. Halban and Burger noted atrophic changes in the levator ani muscles, which they ascribe to faulty innervation and Heil found hypoplasia of the fat, fascia, muscles and ligaments of the pelvis which he also ascribed to faulty innervation. It is to be borne in mind, however, that spina bifida is associated with prolapsus uteri in but a small per cent. of cases, hence the inference that there are contributing factors other than faulty innervation, such as prolonged physical exertion, malnutrition, general visceroptosis, congenital widening of the hiatus genitalis, congenital deepening of the rectovaginal pouch and oversized pelvis.

It is of interest to note that as far back as 1735 Munro reported to the Edinburgh Obstetrical Society, a case of procidentia in a girl three years of age. This case bridges over the gap between the congenital type found in the new-born and the acquired type of later years.

In several of the reported cases the procidentia occurred about the time of puberty, and in these cases it is recorded that the girls were poorly nourished; some with tuberculosis of the lungs associated with persistent coughing, others who were compelled to do hard labor.

A suggestion of the rarity of the lesion in the nulliparous women is found in the excellent contribution of Kepler who collected seventy cases in the literature up to 1911. To this number he added one of his own and eighty from personal correspondence, making in all 151 cases of procidentia uteri in nulliparous women. He classifies these cases as follows:

1. Cases due to congenital defects which occur in the new-born or at the time of puberty.
2. Cases not due to congenital defects occurring later in life.

Freund finds prolapsus occurring in the more advanced ages of nulliparous women begins as a hernia of the pouch of Douglas. As the pouch deepens the uterus and anterior vaginal wall descend. As a rule, this condition begins in early youth and develops slowly. Associated with the congenital deepening of the pouch of Douglas, Freund finds an abnormal inclination of the pelvis.

In my judgment there is an element of infantilism in most if not all the cases of procidentia in nulliparous women. The fact that these women are sterile is highly suggestive. In support of the theory of infantilism as an underlying factor in the development of procidentia, I have two cases to record.

CASE I.—Miss C., seen in the Home for the Feeble-minded, Glenwood, Iowa. She was about thirty-five years of age, had acquired procidentia in early girlhood. Her sister was also feeble-minded. There was lack of general development. All the pelvic supporting structures were atrophied and showed great relaxation. The uterus and vaginal walls were completely prolapsed. No observations were made as to the condition of the spine.

CASE II.—Mrs. L., fifty-five years of age, married thirty-one years, no children, menstrual periods began at fifteen years of age, always irregular (three to five weeks intervals), duration of flow five days, no pain. The menopause was established at forty-one years of age. For the past five years she suffered from frequent urination, getting up three or five times at night. She first noticed the protruding cervix three years ago at the age of forty-eight. The prolapsus gradually increased, but caused no great inconvenience until one year ago she experienced great difficulty in emptying the bladder. The prolapse was complete six months ago and remained so to the time of operation. The patient accounts for the "falling of the womb," by the years of hard work performed on the ranch where she daily carried heavy loads. She was exceptionally strong, nearly six feet in height and weighed about 180 pounds.

On examination the uterus was found completely prolapsed, the vaginal walls everted, and the pelvic floor greatly relaxed with pelvic floor muscles atrophied. No x-ray was taken to determine the possible existence of an occult spina bifida. The operation consisted in a vaginal hysterectomy followed by a colpoperineorrhaphy. Results satisfactory.

Other evidences of the effect of strain upon the uterine supports in the development of prolapsus, are the cases of Webster in which a wagon wheel passed over the abdomen and was shortly followed by prolapsus; the case of Green which followed the lifting of a piano and that of Lihotzky produced by strain at the age of seventy-two.

Poor nutrition in the early years of development has been cited as a predisposing factor. In two recorded cases tuberculosis of the lungs with accompanying persistent coughing brought on the prolapsus. In all these cases it is difficult to account for prolapsus in the absence of a pre-existing weakening of the uterine supports.

The relation of mental defects to prolapsus uteri is forcibly illustrated by the observations of Kepler who collected eighty cases of procidentia in nulliparous women and of this number thirty-eight were mentally defective. In this group were dementia precox, imbecility, idiocy, chronic mania, hysterical insanity, cretinism and nervousness of high degree. It has long been recognized that defective mental and physical developments go hand in hand and the casual relation of mental defects to prolapsus uteri is readily conceived.

Halban, in reporting the case of a nulliparous woman, twenty-seven years of age, whose uterus prolapsed after lifting a heavy load, expressed the opinion that the underlying factor in the development of the prolapsus was a congenital underdevelopment of the muscles of the pelvic floor. He referred to a dissection of a similar case in which Tandler found marked atrophy of the muscular supports. Martin observes that the levator ani muscle in prolapsus is often well developed. Halban admits this as an exceptional occurrence, but says that Martin overlooks the fact that the hiatus genitalis in these cases is relaxed, thereby implying that the inner portion of the levator ani muscle is defective and hence the weakened support to the uterus. Halban and Tandler do not believe with Martin that the weakening of the pelvic connective tissue and elastic fibers accounts for the prolapsus. They regard these structures as mere supports for the blood-vessels which can in no measure resist the force of intra-abdominal pressure. In support of their theory that the intra-abdominal pressure is resisted and the uterus supported by muscular structures alone, Halban and Tandler cite the cases of prolapsus in

the new-born in which there is lack of muscle tone from defective innervation. Schultze is probably more near the truth when he contends that atrophy of the ligaments, connective tissue and muscles of the pelvis, all contribute to the production of prolapse of the uterus. Add to this the suggestion of Ziegenspeck that intraabdominal pressure plays the chief rôle in the development of prolapsus uteri and we have, in my judgment, the most rational solution of the problem.

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## DISCUSSION.

DR. SIGMAR STARK, Cincinnati, Ohio.—I believe that all of us are familiar with the coexistence of pelvic prolapse and spina bifida, but that this state is a concomitant of occult spina bifida is extremely interesting. I am unfamiliar with this feature of the etiology, but I have given the subject considerable study from an anatomical



standpoint. Three years ago I spent a few weeks in Berlin with Liepmann doing dissections on the pelvis in order to familiarize myself with the work done by Tandler and Halban, and came to the same conclusions that Martin did, namely, that damage to the muscular fibers of the pelvis had absolutely nothing to do with pelvic prolapse; that pelvic prolapse was solely due to damage to the connective tissue.

The coexistence of pelvic prolapse in cases of spina bifida can readily be explained on the same basis, namely, you have a defective development of the pelvic connective tissue due to nerve influence just as is the case with the muscular tissue of the pelvis. In the case of pelvic prolapse of the nullipara unassociated with manifest spina bifida, you can readily establish the deficiency of connective tissue throughout the pelvis. The essayist called attention to the insufficient development, the infantilism of the pelvic organs that is present. You have a small uterus, but in particular do you have a shallow vagina, and although a fairly free mobility in an upward and downward direction exists, there is an inhibition of mobility in an anterior and posterior direction, all of which is due to a lack of connective tissue.

To go back again to the subject of my observations as opposed to the findings of Tandler and Halban, I wish to say that close study of their dissection reports and illustrations fails to reveal the evidence of a laceration transversely through the fibers of the levator ani. The pathological condition of the muscles is the result of atrophy and fatty degeneration due to overstretching, hematoma or thrombosis.

What I want to say in particular is, that the whole thing to my mind is a connective tissue disturbance, as connective tissue damage is the result of the trauma of labor, so in congenital prolapse there is a deficiency of connective tissue present in consequence of faulty innervation.

DR. A. J. RONGY, New York City.—I wish to add three more cases of prolapse of the uterus in nulliparous women, two upon whom I have operated, and one that I am going to operate on, on my return to New York. The operation I did in these two women was the usual interposition operation. These women are highly neurasthenic, and if you take out the uterus they stop menstruating and become more nervous.

Dr. Stark mentioned the fact that these women usually have shallow vaginas and that the cervix is inserted very low. Most likely these women start out with a congenital retroversion of the uterus, and the intraabdominal pressure from above causes the uterus to slide down into the vagina and prolapse ensues.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I wish to refer to one case I saw some years ago which bears out Dr. Findley's contention as to the etiology of these cases. This patient was a girl, fifteen years of age, an orphan, who lived with people who worked her very hard. They took her to market and she had to carry home on her arm a market basket overlaid with produce, too heavy for her to carry. In order to get rid of this burden, as soon as she got

into the house, she squatted on the floor, and just as she did so the uterus and vagina came out at the vulvar orifice.

Dr. Rongy is quite right in insisting that one great predisposition to these prolapses is congenital; that is, the uterus is either retroverted or retroflexed, because we all understand that as long as the uterus is of normal size and normally anteverted the increased intra-abdominal pressure will only force the fundus forward; it cannot force it down. I believe that the connective tissue has some power of support. We all know that in regard to the kidney. Every one of us has seen patients exceedingly thin who have had trouble with movable kidney, and after they put on a lot of fat the kidney would move less and less, so that connective tissue must have something to do with it.

With what Dr. Stark has said I agree in the main, but I cannot agree with him that the muscle is not lacerated sometimes.

DR. STARK.—I said the levator ani.

DR. EDWARD J. ILL, Newark, New Jersey.—Dr. T. Gallaird Thomas said in his day that prolapse never occurs in a nulliparous woman. For a great many years I thought so too. The vast majority of cases of prolapse in nulliparæ are elongations of the cervix with secondary dragging down of the tissues and a secondary relaxation of the pelvic outlet. These cases do not present the condition of retroflexed uterus that Dr. Bonifield spoke of. They have an anteverted or flexed uterus and an amputation of the cervix invariably restores these patients. What shortening there may be in the vagina is atrophic, due to downward pressure. I do not think the line of demarcation has been clearly drawn between prolapse and infra-elongation of the cervix. Because a cervix appears outside of the vulva does not constitute a prolapse of the uterus.

DR. HERMAN E. HAYD, Buffalo.—This paper has been very interesting and instructive to me. While I consider myself quite familiar with surgical literature, yet this is the first time my attention has been drawn to the association of spina bifida and adult uterine prolapse. Moreover, it is the first time my attention has been drawn to the use of the x-ray to find the incomplete spinal development. That point is exceedingly interesting, and I am obliged to Dr. Findley for bringing the matter before us. It seems to me, this question ought to be thoroughly discussed.

So far as the frequency of this condition in the nulliparous is concerned, the essayist has looked over the literature and records 143 cases. Gentlemen, there are thousands of these cases, but we do not report them. There is not one of us who has not seen one or two cases of procidentia in the virgin, and they are usually supraelongations of the cervix. I had one of these cases referred to me by the late Dr. Schroeder. The patient was fifteen years of age who, with her friend, went into the country, and they were playing with two pails of water, one in each hand. They jumped from a rail fence, and each one tried to beat the other in the jump and spill as little water as possible. One of these young girls came to me with complete procidentia; the cervix was not simply elongated an inch and a half, but really the whole body of the uterus came out in the prolapse.

I think the condition is very much more common than the essayist records.

DR. O. H. ELBRECHT, St. Louis, Mo.—I am very glad Dr. Findley presented this paper for it seems to me we are getting closer and closer to the cause of this condition by the sort of studies he has detailed here.

There are three classes into which uterine procidentia can be divided.

First the congenital. We have all seen congenital defects that were responsible for uterine procidentia, and I certainly believe spina bifida can be put in that class just as much so as the total absence of the round ligaments or the absence of one of the broad ligaments, etc. The first case of prolapse of this class I ever saw was in a woman eighteen years of age who had a normal delivery without laceration and within two months following it a complete prolapse. At operation I found a complete congenital absence of the round ligament and broad ligament, tube and ovary on one side. Spina bifida can come under the same classification as a causative factor, but it is of functional origin, the result of traction, encroachment on the cord. Accordingly we find club-foot, paralysis of the sphincters, uterine prolapse, etc., and in this way the prolapse is only one symptom (if I may use this term for the sake of clearness) of a group of defects caused by the traction of nerve roots on the cord resulting in improper innervation to the parts. The second class of cases are those resulting from traumatism during childbirth which we all know represent the most common form. The third class can be called idiopathic pelvic hernias. In this class there are no demonstrable congenital defects or evidences of traumatism and the sum and substance of this type is faulty development or atrophy. In this connection I desire to call attention to the case just referred to by Dr. Hayd and Dr. Bonifield. They spoke of the squatting position and lifting causing it. What is the usual history of the onset in inguinal or umbilical hernia. Sudden and forceful lifting or straining. All classes of uterine prolapse are herniations, but the latter class, *i.e.*, idiopathic prolapse, is certainly only one phase of hernias in the general sense arising from the same causative factors at work in the development of inguinal or the umbilical type. Proctologists in analyzing the etiological factors of rectal prolapse must cover the same ground and draw the same conclusion as we do in this field if they go back and investigate the bigger causes at work in the production of this condition.

DR. CHANNING W. BARRETT, Chicago, Illinois.—It is understood that spina bifida has much to do with early prolapse of the pelvic structures. I was glad to see the conservative position taken by Dr. Findley. The question he raises is not, whether this is the only cause of prolapse of the uterus, but he points out that spina bifida causes prolapse in women who have not borne children.

Some questions have been raised in the discussion that are of considerable importance in relation to prolapse of the uterus. As Dr. Elbrecht said, this whole question is one of hernia, and when we stop considering prolapse of the uterus as something entirely apart

from other hernias, we will get at the facts more nearly. To say that inguinal hernia is due to elongation of the mesentery allowing the bowel to come out through the opening, is rather absurd. To say that prolapse of the uterus is entirely due to lack of innervation is absurd; to say that it is due to weakness of the connective tissue alone is equally absurd; to say that it is entirely due to weakness of the muscles is no less absurd. It is everything that causes or allows the structures in the abdomen to get outside of the abdomen, and therein prolapses are hernias.

Now we have no doubt but that the muscles may at times be weak, because they are poorly supplied with nerves, and if muscles are weak they will allow structures to drag down, and the weakness of the muscles of the outlet, inasmuch as there must be an opening, will allow the opening to become larger, but to say that this is the only thing that can cause enlargement of the opening and allow herniation is going farther than most of us will want to go.

Now it is perfectly plain to me that the levator ani muscle does get injured. It is also perfectly plain to me that just as patients can have a congenital weakness of the inguinal region, a congenital weakness of the umbilical region, so they can have a congenital weakness of the vaginal region, and then if added to that a congenital weakening of muscle, we have a weakened or defective innervation, the muscle will do its work poorly. A woman can have a poor pelvic floor, and yet things not come out, but that does not say that the pelvic floor is of no value to hold the structures in. We can have a big pen with a bull in it and gate open, and the bull not come out, but that is not saying the open gate is not a weak point in the enclosure. Now then, prolapse of the organs is a herniation; that herniation will take place by reason of the upper structures being weak, by reason of the pelvic floor being weak, by reason of its being enlarged, by reason of the patient having to lift, and there is no reason on earth why a woman with weakened muscles, although well otherwise, may not have a herniation that is not due to child-birth injury. Of course, most of them come from injury of the supports during childbirth.

DR. FINDLEY (closing the discussion).—We cannot get away from the fact that spina bifida occurs in a large percentage of cases of prolapsus uteri in the newborn. Not a single man who has written on the subject fails to agree that it is due to faulty innervation of the pelvic supports. I was not particularly interested in what are the pelvic supports, whether muscles, fascia, ligaments, connective tissue or what not, but I wanted to bring out the point that faulty innervation is undoubtedly one of the many factors in the development of procidentia uteri, and to call attention to the very interesting observations of Epler who has taken the trouble to use the x-ray in cases of prolapse in nulliparous women. Who else has done it? He has found in twenty-eight cases without prolapsus that there were only three in which spina bifida occulta did exist with the prolapse. In twenty-eight cases with prolapsus, twenty-five of the twenty-eight showed spina bifida occulta. That is rather something for us to think about until we meet again. Defective innervation

is only one factor in bringing about prolapsus. When I see a woman shot to pieces, where the uterus does not come down, it is simply raising the question as to faulty innervation in relation to prolapsus as one of many factors. I cannot agree with those who are trying to establish a single factor for the support of the uterus. We must conclude that not one but many factors are involved as Dr. Barrett has said.

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### RADIUM—A PALLIATIVE.\*

BY

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Saratoga Springs, N. Y.

I HAVE for your discussion a limited experience with a small amount of radium in the relief of distressing symptoms in hopeless, malignant conditions of the female breast and pelvis. I have not a cure in mind, or even a prolongation of life, but simply relief of the symptoms. I have no apology to make for bringing before you a subject with which you, as teachers, operators and clinicians, are familiar; for I believe that these patients ordinarily receive very little consideration, after their condition is pronounced hopeless; and such patients are always in a most deplorable state, mentally, physically and socially.

The treatment of these conditions is to use opium in quantities sufficient to relieve the pain, while the obnoxious odor and acrid secretions remain uncontrolled. The profession is either skeptical, indifferent, or uninformed, as to the fact that radium is the one remedial agent that may relieve all these symptoms. While you are aware of what radium does, perhaps you have not realized, or appreciated, its clinical value in this field.

Pain is always present, requiring constantly increasing doses of narcotics. After radium has been used, the pain is materially relieved, and there is, moreover, a willingness on the part of the patient to omit the use of the opiate; at least this has been my experience and, I notice from the literature, it has also been the experience of others.

Radium also possesses the power to correct the disagreeable odor which accompanies the breaking down of cancerous tissue. This is a very great boon to the patient, as well as to the household. Further, radium controls hemorrhage.

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

It is not my purpose to speak of the history or physical properties of radium, or how it acts. I am like other workers of limited experience with radium in that I have only my own clinical observations and deductions to give you. With your indulgence, I present, briefly, a few histories.

CASE I.—Miss B., aet. forty, had her left breast amputated for carcinoma by a most competent surgeon; later he operated several times for the removal of postoperative nodules which continued to reappear. She was finally told that he could do no more for her, and that her only hope lay in the use of the *x*-ray. She had received twenty-eight *x*-ray treatments when she came under my observation, and, she reported, without appreciable betterment. No promise was held out to her, but that I would be glad to try radium. She was greatly emaciated, in constant pain, taking opiates continuously; she was, indeed, a nervous and mental wreck, and without relief, she could not live long. There were many nodes present in the field of operation, varying in size from large pea to pigeon egg; in addition, the entire incision was greatly indurated. She went at once to the hospital, and twenty-five milligrams of radium element was used continuously for 4000 milligram hours. She returned two weeks later, but she had been burned so severely during the first application that I could not treat her at this time. She was very cheerful and happy, however, as the nodes had diminished in size and some had entirely disappeared. The pain had ceased, and she had discontinued her opiates. The burns healed in about a month. I have treated her for the past year, once in four weeks, for 1500 milligram hours. The nodes have entirely disappeared, she has gained in weight, is free from pain, and is both cheerful and hopeful.

CASE II.—Mrs. C., aet. fifty, came into my service at the hospital. She was an emaciated, worn out, nervous woman, who had a huge malignant breast that had already commenced to break down; the axilla was full of palpable glands. This poor creature had kept her secret and worked daily for months, when the pain, odor and discharge compelled her to abandon her work. Surgery alone could promise nothing. After consulting with my colleagues, we amputated the sloughing mass, cleaned out the axilla, and buried twenty-five milligrams of radium element in the wound for 2400 milligram hours; and then used it externally continuously for 9600 milligram hours, moving it over the entire area. The pain stopped almost immediately. The wound has healed and she is very comfortable. And so far—only six months, however, there is no evidence of a return.

CASE III.—Mrs. A., aet. eighty. This old lady had no doctor. She was sure she had a cancer, and that she was going to die with it. She suffered much and had taken paregoric for months. The odor was unbearable, and it was for this she consulted a physician. Upon examination I found the pelvis a solid mass; bladder, vagina and rectal walls all being involved. I used twenty-five milligrams of radium element for 250 milligram hours in the vagina, and 250

milligram hours in the rectum the following day. She would not allow me to treat her thereafter. The pain left her within forty-eight hours, and the paregoric was discontinued. The odor diminished within ninety-six hours to such an extent that her family could be in her room, which previously was impossible. She lived about six weeks from the time I first saw her.

CASE IV.—Mrs. S., aet. sixty, came to me with the diagnosis of cancer. She had refused operation, and desired to have the radium treatment. On examination a very large cauliflower-like growth was found in the vault of the vagina. The cervix uteri could not be detected. This patient had been very stout, lost much weight, was very weak, in constant pain, and complained of a foul acrid discharge. After three applications of twenty-five milligrams of radium element for 2400 milligram hours at each treatment, at intervals of three weeks, the vaginal growth, pain and discharge had disappeared.

CASE V.—Mrs. S., housewife, aet. fifty-one, was referred to me for a hysterectomy, on account of continuous hemorrhage for over a year. All treatments resorted to had been without avail. The patient lost 30 pounds in weight, was practically exsanguinated, and edematous. Hemoglobin index 40; red blood count 3,600,000; albumin and casts in the urine. She was a grave surgical risk. I could not discover any growth.

The use of radium was suggested and accepted. Twenty-five milligrams of radium element were placed in the uterus for 100 milligram hours daily for six days; after two weeks, a similar series of treatments were given. The hemorrhage ceased on the fourth day after the first treatment, but reappeared sixteen months later. The radium was again used as before, 100 milligram hours for three days, when the hemorrhage ceased. Four months have elapsed since the second treatment was given without further loss of blood.

CASE VI.—Mrs. X., aet. fifty-six. Panhysterectomy two and one-half years previously. Complete recovery, and well for two years after. For the last six months she has had a bloody discharge from the vagina. She kept this condition from her family until the constant pain and bad odor compelled her to seek relief. A digital examination of the vagina proved impossible on account of the presence of a cauliflower-like growth. There was a profuse, bloody, purulent discharge of a vile odor. The pain was constant, loss of flesh pronounced and she was very weak. Twenty-five milligrams of radium element were used in the vagina for 2100 milligram hours. At the end of two weeks she returned for a second treatment. At this time the pain was gone, the odor much lessened, and it was possible to examine the vagina. Two more treatments of the same quantity of radium were employed at the same intervals. When she returned after the fourth treatment, all symptoms had disappeared and the vaginal growth was gone.

A synopsis of these cases shows that pain was relieved; that odor was markedly controlled; that hemorrhage had ceased; and that

there was a change in or a disappearance of the local pathological tissues. Two patients died in coma two months after the treatment. Four are alive and hopeful. In Case V, the uterine hemorrhage was not of cancerous origin, but the condition was a terminal one. I am sure the patient would have died had it not been for the use of radium.

These few cases are not sufficient to draw definite conclusions. But nearly every worker with radium makes the same statements concerning its value in the relief of pain, hemorrhage and odor, but without emphasis in relation to its use in this particular field. In calling your attention to these cases, I cannot but feel that the results I have observed are more than merely accidental.

In using radium in these cases I believe it is possible to produce a toxemia which may prove fatal. I have seen the end hastened in this way. I would suggest two precautions when applying radium locally; *first*, a patient with a low leukocyte count should not be given prolonged applications of radium; and, *second*, when radium is used, it should be accompanied by the liberal administration of alkalis.

Finally, I wish to emphasize as my conviction, that no case of this type is so desperate, and no postoperative condition so hopeless, that radium should not be used with an expectation of the alleviation of the distressing symptoms.

511 BROADWAY.

#### DISCUSSION.

DR. ROLAND E. SKEEL, Cleveland, Ohio.—I am glad indeed Dr. Moriarta has called our attention to the radium treatment of inoperable carcinoma. We have been using radium only about a year, and while we have but few definite ideas to put forth at this time there are two or three things that can be said to be proven. We have used a larger dosage than Dr. Moriarta, he using a smaller quantity over a longer period of time. He gives about the same number of milligram hours as we do but the results are quite different according to the period of time over which it is applied, although the total number of milligram hours is the same.

As to the local application of radium in carcinoma of the cervix, we no longer perform the radical operation for this disease unless the case is seen very early, practically only if we find it by accident, if it is not a clinically demonstrable carcinoma, if it is proven to be such only by the use of the microscope; then we feel that it is a case for radical operation, but in patients with large cauliflower excrescences or huge excavations, even though the uterus is freely movable, our results have been so disastrous so far as recurrence goes that we resort to a palliative operation only, plus the later use of radium, and



the palliative operation chosen is the Percy cauterization without preliminary curetting. As soon as the sloughing produced by the heat has stopped and the vault of the vagina is clean, radium is used. In one of our patients, a woman thirty years of age, this method was used, the primary operation having been performed five months ago. The uterus was as large as two closed fists and the whole vault of the vagina was excavated by the Percy method, followed by the use of radium two months later. My impression is that at this time we gave her 3000 milligram-hours of radium after the method of Schauta, 50 mg. for twelve hours every second day. I examined her only a day or two before coming to this meeting and found the entire cervix gone, the vault of the vagina smooth with a dimple showing the location of the uterine canal. She has had no hemorrhage, not even a menstrual flow, and most remarkable the body of the uterus is no larger than my thumb, a really startling result from the application of this combination of surgery by heat followed by radium.

While I am glad the essayist brought up the subject of radium in inoperable cases of cancer, I would have been gratified had he spoken of its postoperative use in every case of *carcinoma of the cervix*. There are portions of the body in which it does not seem to work so well, but both as a palliative measure in inoperable cancer of the cervix and after operation as a safeguard against recurrence, it seems to be of great value.

Our one year's experience with radium in approximately twenty-five cases shows some results that on the surface seem unbelievable, and makes it certain that it is a therapeutic agent well worthy of serious investigation.

There is one more matter I wish to call attention to. That dangerous toxemia may result from the prolonged application in advanced cases cannot be doubted. One patient in whom 50 mg. of radium was buried in the wound for twenty-four hours went into a quiet sleep lasting for a week and then died. There seems not to be so much danger from its use in large doses over a short period of time as there is from smaller doses continued longer. Three of these patients I have seen go to sleep without pain, remain more or less stupid for some days, and then die quietly; to be sure they were hopeless from any standpoint and were much better off dead, but one does not wish to be regarded as a public executioner even though he secures euthanasia. I do not wish to be understood as saying that an ordinary dosage of radium in the average case is associated with any danger, but that its prolonged use in patients already toxic may cause death as above described is my conviction from my short experience with it.

DR. SIGMAR STARK, Cincinnati, Ohio.—The previous speaker has really covered the ground I wished to dwell upon, but I would like to say a few words with reference to the small quantity of radium that the doctor uses in the treatment of his malignant cases. Fifty milligrams to my mind is the smallest amount you should employ. When a person undertakes to treat a case of carcinoma of the cervix, or carcinoma of the vault of the vagina, he ought to use from 50 to

100 mg., and it ought to be used for a short period of time, possibly ten to twelve hours, at intervals of from two to four days depending upon the resistance of the patient. If you do it in that manner, you will not get serious toxic symptoms. Furthermore from the use of small quantities of radium over a prolonged period you accomplish exactly what was described by the essayist. You destroy the carcinomatous material *in loco* through a short distance, and consequently cure it symptomatically, but you actually stimulate the growth of the tumor at a distance.

From my experience, the field of usefulness of moderate doses of radium in gynecology is principally in the treatment of benign tumors and those miserable cases we all have to contend with—those cases of idiopathic menorrhagia for which we have done everything imaginable to stop the hemorrhage, cases in which we could not find any pathological condition to account for the bleeding. I want to say to you, if you will properly use a small quantity of radium in such cases you will invariably stop the bleeding without prematurely bringing on the menopause, which is the case when you employ the x-ray for the same purpose.

If I am permitted time, I would like to recite two cases that came under my observation last spring. One was the case of a woman who came from Sewanee, Tennessee. She had a uterine cavity which measured 6 inches in depth and was bleeding almost three weeks out of four. She was supposed to have a fibroid tumor and sent to me for the purpose of operation. I could not make out a fibroid nodule, but considered the case one of subinvolution which was associated with a complete perineal laceration. I curetted her, and introduced into the uterine cavity forty milligrams plus radium element for a period of twenty-two hours. She left the hospital four or five days after the introduction of the radium, went home, and came back recently, and examination disclosed the fact that the uterus was shriveled up and the uterine cavity measured less than  $2\frac{1}{2}$  inches. There has been no bleeding since.

The other case was a young woman, twenty-five years of age, eager to have children, with no appreciable change in the uterus. There was absolutely no evidence of a pathological condition, but that woman was a sufferer from menorrhagia for several years for which she had been curetted several times. I curetted her in June, and introduced 35 mg. of radium element, leaving it *in situ* for eight hours. Her physician Dr. Lurie, of Cincinnati, told me recently that she missed her July menstruation but menstruated four to five days in moderate quantity and without pain in August and September.

DR. FRANCIS REDER, St. Louis, Missouri.—I would like to report a case in connection with this discussion. It was one of recurrent sarcoma of the left side of the neck operated on about four months previous to the recurrence showing itself. The tumor was about the size of a goose egg. The first operation was a very extensive one, and under the conditions I did not care to undertake a second one. The patient was anxious to take the radium treatment. In this I encouraged him. He consulted a physician who possessed \$14,000 worth of radium. It was interesting to note how the tumor became

reduced under the radium treatment. The bleeding, which was very free, sometimes bordering on an actual hemorrhage, ceased. The pain, which was at times very severe and acute, disappeared. It was very noticeable, too, how the patient was reduced as far as the soft structures are concerned. Two months after the application of radium the patient died.

DR. HUMISTON.—What was the cause of death?

DR. REDER.—Simply exhaustion.

DR. MORIARTY (closing).—I had no thought of considering the broad use of radium in my paper; simply wished to suggest its possible value in controlling desperate symptoms in hopeless cases. The radium treatment gave the patients comfort and relief.

Dr. Skeel has raised the point in relation to the relative value of radium applications; that is, whether it makes any difference if the same milligram hours are the result of the use of a small amount of radium for a long time, or a large amount for a short time. This point is of interest, though difficult to determine. The one who works with a small quantity of radium naturally cannot decide what a large quantity might do; and those men who have a large quantity, of course think it unwise to work with a small quantity. One of the speakers has suggested that a small amount is objectionable because it has not the power of deep penetration, and may stimulate some part, instead of annihilating the growth. It is an accepted theory that the gamma rays do not penetrate more than 5 cm. However, the discussion of these points was not my purpose. It is unfortunate that workers with a small amount of radium cannot develop technical information as to its value. Clinically, however, they are forming a number of valuable conclusions.

It goes without saying, as one speaker has emphasized, that surgery is the most valuable remedy we have in all localized malignant conditions. Experience has also taught, I am sure, that radium is a valuable aid to surgery and should be used in connection with it, particularly in breast cases. I believe it should be buried in the operative wound, and later, after the wound has healed, used externally. I believe, when used in this way, it is a very valuable prophylactic measure, although with limited data, I have no way of substantiating this conclusion. I am sure, however, that time will show its value in these conditions.

The question of toxemia in the local use of radium is interesting. The patients whom I have seen and thought died with radium toxemia, died in coma, suggesting uremia, though the secretion of urine was up to normal in quantity and specific gravity.

## THE STANDARDIZATION OF DEFINITE PROCEDURES DURING GYNECOLOGICAL OPERATIONS.\*

BY

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A VISIT to several gynecological clinics will soon demonstrate that there are surprisingly few surgeons who have adopted standardized methods of procedure during their operations. Surgical technic in this country has attained a high plane of excellence due to advanced surgical skill, to efficient nursing and well-equipped operating rooms, but it is also true that refinement of technic and elaborate armamentarium do not always mean efficiency. Throughout the country there is a gradual awakening to the importance and necessity of hospital standardization and much discussion has been aroused in this connection. In studying hospital management and equipment, a prominent investigator recently remarked that a visit to some of our prominent American hospitals showed that the surgeon has much to learn about motion-study, time study and waste elimination.

It is a well-known fact that the gynecologist has placed pelvic and abdominal surgery on the high plane which they occupy to-day, and it is also true that the mortality in these surgical areas will probably not be much reduced, so that any advancement and improvement in pelvic surgery must be in lessening the morbidity.

Aseptic and general operating room technic are so perfected that our modern nursing corps can be trusted with these details, and it has been our observation that any error in technic, or irregularity during operations can, in most instances, be attributed to the surgeon himself or to his assistants. It is our purpose in this discussion, therefore, to consider some factors in the gynecological operating room which may lessen still further the surgeon's responsibility and improve his operative results. These observations and deductions are based on analysis of some of our errors made in a series of over three thousand gynecological operations performed by the writer in one hospital.

In our case analysis the greatest source of error, as with probably every operator, has been in diagnosis. The gynecologist must always bear in mind that from the very anatomical and physiological nature of the female pelvic organs, they are subject to many varia-

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tions within a very short space of time. As many of the conditions are chronic, immediate operation is not always performed, so that some time may elapse from the date of diagnosis to operation. We have learned from a few experiences that before operating for any pelvic condition it is a wise precaution to examine again very thoroughly immediately before operation, especially when anesthetized, not only to make a correct diagnosis and verify our previous findings, but also to exclude with certainty the existence of pregnancy, recent inflammation and carcinoma.

To operate for lacerations or chronic adnexal diseases during pregnancy is an error that is not only embarrassing but almost inexcusable. On four different occasions, patients who had been examined several weeks before, were prepared for plastic operation when the pre-operative examination revealed early pregnancy, thus averting a possible abortion.

On a recent visit to several well-known clinics, the writer witnessed three pelvic operations in which pregnancy was not recognized until the operation had progressed. In each instance the embarrassing mistake was due to the operator having failed to make a vaginal examination immediately before operation and by placing too much reliance on the case-history or on the examination made at some previous time.

Appendicitis in the female simulates almost every pelvic and abdominal lesion so frequently that several errors have taught us never to neglect the pelvic examination regardless of the age or social condition of the patient. Ectopic gestation, acute pyosalpinx, torsion of cyst pedicle, retroflexed gravid uterus, and impending abortion are some of the conditions improperly diagnosed and suggestive strongly of appendicitis. A careful vaginal examination would in most instances have rendered a correct diagnosis comparatively easy. Carcinoma of the uterus, even though very early, should be diagnosed before operation as the preparation of the patient as well as the operative procedure is quite different from the general type of pelvic surgery.

Operation during acute or recurrent inflammation of the adnexa is attended with such pronounced morbidity as has been so ably demonstrated by Warder, Simpson and others, that in cases presenting symptoms of recent inflammation of the adnexa, it is our rule to postpone operations until a clear diagnosis is established and the temperature has been normal for several days. One death in our series resulted from such an oversight, and in three other instances the convalescence was unusually severe. It is our rule, therefore,

in every case except in some virgins, to cleanse the vagina, empty the bladder and to personally examine bimanually under anesthesia, after which one or both assistants may examine if the condition of the patient warrants it. We have found that the most satisfying part of the hospital interne's work in his gynecological service is the instruction he receives from such an examination. In order to analyze our mistakes, this preoperative diagnosis is dictated at once and made a part of the operative record.

Some of our mistakes have demonstrated that any disease of the uterus or adnexa severe enough to require operation also warrants preliminary curettement every though there is no distinct symptom of endometritis. Such curettement requires but a few minutes, and in addition to its rendering good uterine drainage, it is a valuable procedure from a diagnostic standpoint. Of course, all curettings are examined microscopically and have been the basis of study from different angles. By having neglected this precaution of curettement in our earlier experience, two instances of very early carcinoma of the fundus and one of tuberculous endometritis were overlooked. In another instance where pyosalpinx was correctly diagnosed and operated upon for the relief of pelvic pain and irregular bleeding, early carcinoma of the uterine body was present but not discovered until later.

The legal responsibility of the operator should be considered by him in every operation that is undertaken, and benefiting by the annoying experience of some confreres and a threatened lawsuit in our own experience, it has been a source of satisfaction to secure from the patient, the husband, or father, full consent to perform whatever operation the surgeon deems indicated. For a short time we adopted the method followed in some institutions of having the patient or his responsible agent sign a printed form releasing the surgeon as well as the hospital from all responsibility, but the method was sometimes resented, so that consent always obtained in the presence of an assistant or nurse was found more satisfying and equally protective in its legal aspect.

Unnecessary time consumed during the preparation of the patient when anesthetized has been noted in our own work in the past, and a constant endeavor is being made to eliminate such waste. Here, again, team work has been a great factor. It has been found that in a general hospital where there is of necessity a certain amount of rotation of service both in the interne and nursing corps, much time can be saved and more efficient results obtained by a course of operating-room demonstrations and lectures outlining to the beginner his

or her respective duties, so that when actual participation in operation occurs time is not wasted. The ideal method, of course, is the one that exists in some institutions, such as in the Crile and Mayo clinics, where team work predominates. With standardized methods, however, every operating room can, at least, approach a more efficient status.

Surgeons are practically unanimous in agreeing that the anesthetist is a decided factor in successful operative work. It is no exaggeration to state that our mortality and more especially our morbidity has decreased with the employment of a graduate nurse as anesthetist whose entire time is our own, rather than one who anesthetizes for different surgeons. Her duties at other times are practically that of secretary, and her constant knowledge of the patient's condition renders a follow-up system comparatively a simple matter. It may be argued that a physician experienced in anesthetics is more responsible, especially in emergency, but we have learned that the nurse after a thorough course in anesthesia is always dependable. Further, she does not aspire to become a surgeon and consequently her interest is not in the operation proper, but concerned wholly with the anesthetic.

We have demonstrated to our own satisfaction that standardized methods, once adopted, are easily followed and are productive of the best immediate as well as remote results. But it requires the hearty coöperation of a well-trained but not necessarily large organization, in other words "team work." The surgeon is at all times the responsible head in the operating room, and unless his attention to details is at all times exacting, efficiency and team work are impossible as it is only natural that the department reflects the energy and efficiency of its head.

Standardized methods, as well as a constant uniform technic, can be brought to its highest perfection only if a surgeon limits his operative work to one institution, where he can have constant supervision of his daily work and where he has additional coöperation of the hospital organization.

A harmonious relation with other members of the hospital staff is not only desirable but essential, for it is to the mutual advantage of all concerned and more particularly to the patient to have consultation and diagnostic facilities which a congenial staff only can furnish.

The presence in the operating room of friends and relatives of the patient and other nonmedical visitors is a most reprehensible practice and should be frowned upon by every ethical conscientious

surgeon. The preoperative period during operation tends to disturb team work and efficiency, as has been observed in other clinics.

The assistant plays a most important rôle in the surgeon's success, and after several trials it has been found that the employment of a well paid rather than a volunteer or temporary assistant is of great value. On this paid assistant devolves much more responsibility than mere assistance at operation. He is entrusted with the careful observance of all standardized methods which the surgeon has adopted, such as preoperative preparation as well as the postoperative care, and also the final examination of the patient before discharge. As chief registrar of a large general hospital for some years, we have learned that the interne as well as the house officer frequently regards the keeping of records as clerical work, and consequently such records were not accurate and of little value for subsequent study. By entrusting the supervision of records to the salaried private assistant, however, the records are of the greatest value both to the hospital and surgeon.

An elaborate technic is frequently productive of mistakes, and experience has taught us that by adopting a simple definite technic of approved methods, including a minimum variety and number of instruments, a written copy of which is constantly at hand, the possibility of errors is greatly reduced. Such standardized methods likewise make it possible to eliminate waste and to conduct the operating room on an economical as well as efficient basis. A careful study of operating-room expenses has shown that time-waste and up-keep can be reduced 20 to 30 per cent. without restricting efficiency.

The pad count has always been an uncertain and dangerous factor in abdominal technic and in spite of many ingenious devices, there is always the possibility of mistakes, especially when the counting devolves on a nurse or other assistant as is the usual practice. The responsibility of accurate pad count is so great that we have not deemed it fair to delegate that task to others. After trying several methods, we have found the following satisfactory that we have standardized it in our work. Pads of one size only are used as different sizes are confusing, and so-called wipes are never used in abdominal work. Five to fifteen pads are usually sufficient for any ordinary section, consequently only fifteen pads are supplied with more in reserve. To facilitate quick and accurate counting, the pads which are made 12 by 3 inches are arranged folded once in bundles of five, four being placed in layers while the fifth as a semiwrapper. Three such bundles are in every package, which before being sterilized, are counted at least three times. When



everything is in readiness for making the incision, the bundle of fifteen pads is opened by the first assistant. He signals for absolute silence in the operating room, and then as he exposes the pads to view one by one, the operator, first assistant, and second assistant count aloud fifteen pads. As the soiled pads are discarded, they are hung on a pad rack in full view of all in the room.

Before the abdomen is closed and immediately after its closure, the operator and the two assistants again count aloud the number of soiled and unused pads. The counting aloud not only by the assistants, but also by the operator himself, induces a positive count and limits the responsibility to the surgeon, a responsibility which he and not the nurse should bear as has been frequently demonstrated in our law courts.

Neglect to explore the upper abdomen, when operating for gynecological affections, has resulted unsatisfactorily in several instances. In some pelvic operations so much time is consumed or such unexpected infective material is encountered that exploration of the clean upper abdomen is not justifiable. We have found it expedient, therefore, in every abdominal section to examine at once the gall-bladder, stomach, appendix and even palpate the kidney before proceeding with the primary pathology, and immediate dictation of the condition of the structure examined is made.

In a recent series of 500 consecutive operations for gynecological affections, gall-stones were discovered in forty-five instances, about 9 per cent. where the history for that condition was negative. The appendix is, of course, always examined and as an almost routine procedure removed. If not removed, particular note is made of the fact in the operative notes, as not infrequently immediate or remote postoperative discomfort or pain may indicate appendicitis and a knowledge of its condition at the time of operation is satisfying, if not conclusive.

Postoperative ileus has occurred five or six times in our series. In two cases in which a second operation was urgently indicated, the omentum was found rolled and displaced to one side of the upper abdomen. Readjustment of the omentum relieved the symptoms in both cases. This experience may explain some of the unusual postoperative pain frequently encountered, due no doubt to the violent peristaltic action of the underlying intestines. Here, again, we have made it a standardized rule in every case after pads have been removed and the peritoneal toilet completed, to lower the patient from the Trendelenberg position and then readjust the intestines and omentum.

It may be argued that all these mistakes have been recognized and corrected by every surgeon of experience, and that no new thought has been advanced. We believe, however, that if the surgeon would tabulate his mistakes and review them, together with his successes, he may discover that there is room for improvement.

Our own deductions are that: 1. Many mistakes that are made during gynecological operations are preventable. 2. While the operator is legally responsible for every action in the operating room the average surgeon does not take adequate measures to safeguard the patient and himself. 3. By adopting a definite routine or standardized method, both for himself and his assistants, better team work is accomplished, and, consequently, lessened mortality and morbidity

714 JENKINS BUILDING.

#### DISCUSSION.

DR. JOHN W. KEEFE, Providence, Rhode Island.—I feel that this is a remarkable and timely paper. If we would pay more attention to efficiency and to team-work in our operations, our patient would be greatly benefited.

I was glad to hear the essayist say that it is advisable after cleansing the vagina and emptying the bladder, to make a careful examination while the patient is under ether, because then one often is able to revise his previous diagnosis. In the hurry of to-day, when a patient wants to come into the hospital at nine o'clock in the evening, and be operated on the next morning, the patient is usually examined by an interne, the operator comes to the operating table without knowing much about his patient, saying, "Well, we will see what we find when we get inside the abdomen." Many times I have seen even the best operators in this country make an error on opening the abdomen, when they would have acquired valuable information had they made a previous vaginal examination while the patient was under ether. This examination should be made as a routine practice.

I feel strongly with reference to counting sponges. We ought not to count sponges. We should not put sponges in the belly, and if we did not put them in, we could not leave them there. Recently, an interne in a hospital told me that during his service of a year and half he knew of five sponges having been left in the abdominal cavity. He cited one instance where he was the first assistant at the operation, a sponge count was made, and the nurse said they were all there, and he told the operator that he felt there was still a sponge inside, and the operator replied, "Well, you heard what the nurse said." "Yes," he said, "but I still feel there is a sponge left inside." But the operator paid no attention to him. He did not try to find the sponge; he sewed the wound up, and when the young surgeon was in the dressing room he said again to the surgeon, "I do not feel right about that case; I feel there is a sponge left behind

The operator replied, "If you think there is a sponge in there, take it out." The patient still being on the operating table, the young man opened the wound, removed the sponge, and sewed the wound up again.

Sponges or instruments must be many times left in the abdominal cavity and nobody has known that the accident has taken place. I feel it is unnecessary to pack sponges in the belly. When one stops to think how rough a piece of gauze is, when he is scrubbing his hands and arms, especially if he uses that gauze with a little pressure, he will find how irritating it is. Now with every respiration the patient makes, the sensitive peritoneum covering the intestine is irritated by the rubbing to and fro of the sponges. I feel that many of our postoperative adhesions are due to the fact that we use gauze to wall off in the abdominal cavity. This can be better done by the use of sheet rubber which is moist and smooth.

DR. JAMES F. BALDWIN, Columbus, Ohio.—There is just one point in connection with this paper that I desire to discuss briefly, and that is in regard to friends of the patient being in the operating room. I have in all my professional career been glad to have some representative of the patient in the operating room. I tell them frankly we have no operating room secrets; that we are very glad to have them in. I have never had occasion to regret it, and on many occasions I have been glad to have some friend of the patient present who can see what we have to contend with. I have sometimes said to the representative of the family, who was in the operating room, that something must be done a little different than what we expected in this case, and have gotten his consent to go ahead. He represents the patient in law as well as in morals, and I have never been sorry for allowing a member of the family or representative in the operating room; it does no harm, and it may do much good.

DR. GEORGE VAN AMBER BROWN, Detroit.—Just a word with reference to having some member or representative of the family in the operating room during the operation. We do not ordinarily allow any one in the operating room. That is a rule of the hospital, but in a recent experience the husband insisted that he be present and we consented to let him come in. After the operation he said, "Did you notice me while you were operating?" I replied "No." "Well," he said, "I watched you two doctors very closely as you stood there, to see if my wife quit breathing or looked as though she was going to die, and if there were indications of it, I had my revolver ready to shoot either one of you."

DR. JOHN D. S. DAVIS, Birmingham, Ala.—Referring to packing the abdomen with sponges, I will say that I no longer use small packs or sponges. In my work I have three sponges, one of which is used in the abdomen, one for gall-bladder cases and one for a general and abdominal sponge. Two of these are about 5 inches wide by 15 feet long, and one  $2\frac{1}{2}$  inches wide by 3 feet long. This last named is for use in gall-bladder cases. One sponge 15 feet long by 5 inches wide is enclosed in a pouch and attached to the

patient's side. When the abdomen is being opened this sponge is pulled out of bag or pouch and used for mopping or wiping away blood, and as used is deposited in basin. The second long sponge 15 feet by 5 inches is immersed in warm normal salt solution and used to pack off the intestines. This has a long tape to which a pair of forceps is attached. There is never any small individual sponge or pad put in the abdominal cavity. I think this precaution is necessary regardless of every other care we might take. If we use individual sponges, we are sometimes liable to leave one in the abdominal cavity.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I do not rise to discuss the various minor differences of technic, because I think it is important that every man should work out his own technic, and only depart from it when he is thoroughly convinced that there is something better, and train his assistants in turn to follow that technic. It saves time.

There are two points I wish to refer to, and I know Dr. Crile will disagree with me, and one is about the nurse giving the anesthetic. I thoroughly believe in women giving anesthetics, but a woman doctor is better. I still believe that there is not work enough for the doctors as it is, and we ought to employ members of our profession if we can. In the second place, it has been my observation that the hardest thing we have to do with nurses is to keep them from getting the swelled head, and if you get them to do some of the work that belongs to us they think they can do it all.

Last Sunday morning a friend of mine brought in a patient with an acute gall-bladder condition. The gall-bladder was filled with pus, and because the patient did not seem to be dying the nurse did not see the necessity of operating on Sunday. I was thoroughly convinced that the patient should be operated upon that day. But that is the trouble with nurses. The more you give way to them, and the more you do for them, the more you spoil them.

The next point has reference to the paid assistant. I have always had an assistant but do not usually pay him, and the reason I do not pay him is this: I served an apprenticeship myself, and the only place to learn surgery is at the operating table or across the table from some good man. I believe operators, like Dr. Humiston and Dr. Crile, ought to be able to turn out five or six good operators during their active careers. I have turned out three, and I hope to turn out three more before I die. In giving them this apprenticeship, it introduces them into my clientele, and establishes them in practice. I think they are getting ample pay without cash, and I have never had any difficulty in keeping them. Usually I have to tell them when they must go and practice for themselves; that they have been with me long enough and should now stand alone. I want to impress and emphasize the one thought, that it is our duty as surgeons to make other surgeons and to rotate assistants as often as is consistent with having them do good work.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In discussing the paper of Dr. Weiss, I wish to take up the discussion where

Dr. Keefe left off, knowing that the latter has not had the opportunity of covering all the points that were in his mind, especially with reference to the matter of pads. Two points are to be especially emphasized in this connection, namely, the prevention of friction and the prevention of chilling the abdominal structures. If pads are used, they should be covered with rubber or oiled silk, in order to eliminate friction upon the peritoneum or other tissues. In abdominal explorations I use gloves, oiled with sterile paraffin, free from fluorescent hydrocarbons and sulphur or sulphur by-products. Furthermore, all pads and large instruments used in the abdominal cavity should be warmed. If these precautions are observed there would be less danger of postoperative adhesions, ileus, or other complications.

The condition of the bladder should always be carefully investigated. In this connection I recall a case in which I was asked to do a laparotomy for hypogastric tumor, situated half an inch above the umbilicus. According to the history, the patient had been passing 40 to 50 ounces of urine every twenty-four hours during the two weeks that she had been under observations. I insisted upon catheterizing the patient, and upon doing so obtained  $78\frac{1}{2}$  ounces of urine. The tumor disappeared, and no operation was performed.

DR. RUFUS B. HALL, Cincinnati, Ohio.—I rise to discuss one or two points in connection with this paper. I think that each operator should perfect his own technic in reference as to what goes inside the abdomen. If he uses pads, he should have his own technic perfected regarding their use; this method would eliminate leaving something inside, *with due care*.

In the next place, I wish to speak in reference to visitors being in the operating room. My experience has not been as pleasant as that of Dr. Baldwin, but I am of a different nervous temperament perhaps from my friend Dr. Baldwin. It annoys me considerably to have the husband or a brother or sister in the operating room, and sometimes it becomes exceedingly unpleasant. I have had a number of unpleasant incidents occur, one of which I would like to mention as a curiosity.

I was asked to do an operation on a patient for appendicular abscess; he was the only son of a prominent doctor in our city, a boy about sixteen years of age. It was a late operation. The father refused operation for about three or four weeks after the family physician had urged it because he, the father, said all of his friends who had been operated for appendicitis were out in Spring Grove, which is our cemetery. I saw the boy three or four weeks previous to operation, and then advised an operation. Once in the interval I went to see him and said it was rather late for any kind of operation now, and with the family doctor I thought the boy would die. However, a week later the father wanted him operated, and insisted on being in the operating room at the time. The boy had an enormous tumor, the size of an adult's head, in the lower abdomen. When I opened into the abscess cavity, the father demanded that we quit the operation, and not even sew up the wound, and so he

had to be put out of the room forcibly before we could finish the operation. The boy recovered and is still living, but that incident was very unpleasant, and I do not think we ought to encourage anything of that kind. If the family has not the confidence in the surgeon and are unwilling to accept the statement of the family physician, he being present, the surgeon would be better off not to have anything to do with that patient.

DR. GEORGE W. CRILE, Cleveland, Ohio.—The question of the anesthetist has interested me very much, and I agree entirely with the essayist that the nurse anesthetist is the best solution of the anesthetic problem. She is very amenable to training, it is the height of her ambition to succeed, and she can train others. She becomes a resident in the hospital, so that an expert anesthetist is at hand for service both day and night. To show what the nurse anesthetist can do, I may say that in the surgical service of the Lakeside Hospital, nurse anesthetists have administered nitrous oxid over 1600 times without one fatality. Certainly this fact speaks well for the nurse anesthetist.

DR. TATE.—Is it not against the laws of Ohio to have a nurse administer anesthetics?

DR. CRILE.—I believe that question is now under discussion in Ohio, and it has not yet been finally decided. It is certain that in any case the laws should be so framed as to permit the most efficient solution of the anesthetic problem.

DR. WEISS (closing).—Nobody would accuse Dr. Baldwin of advertising because he is above that, but I do not approve of having visitors in the operating room. I look upon it as a cheap advertising scheme, to say nothing about the ethics.

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## A MODIFIED GILLIAM OPERATION AND ITS ULTIMATE RESULTS.\*

BY

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RETRO-VERSIO-FLEXION of the uterus *per se*, is an abnormal condition which invites complications and sequelæ of a much more pronounced pathological nature. It interferes with the bladder and rectum. It is the first step in descensus of the uterus, because the normal retentive angle formed by the long axes of the uterus and vagina, respectively, is eliminated, permitting the uterus to slide, like a wedge, down in the vaginal tube. Retroversion is more harmful to the ovaries than to the uterus. To a uterus without ova-

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

ries it might be more innocent of harm. In the ovaries, chronic inflammatory conditions and follicular degeneration are the result of the persistent venous hyperemia and traumatism, to which descended and prolapsed ovaries are subject. It is true, exceptional cases are not rare, in women with retroversion who live many years in good or fair health, either because they have a strong resistant organism, or are mentally not disposed to yield to their feelings; or they are so situated as to take life easy. But the skilled neutral observer can often detect in them local or referred symptoms due to this weakness, and the first spark of potent infection finds in them a loaded magazine.

Those in our ranks who recognize no evil in this condition, until a blaze has occurred, will, usually, also operate upon cases of such displacement which have pronounced complications; and they profess to do so for the latter chiefly. If they want to be consistent, they can treat the complications only, but they must leave the uterus where they find it; for according to their teaching, any position of the uterus is normal as long as it remains within the pelvis. But almost invariably they do something to correct the displacement; and in doing so, their action belies their words as to the harmlessness of retroversion.

Aside from mechanically interfering with the bladder and rectum, the potential pathological factor in retroversion and retroflexion of the uterus is the involved embarrassment of the venous circulation in the parts. This results from the inevitable torsion of the broad ligaments in which most of the veins are suspended. W. Waldeyer(1) says, "retroflexion of the uterus, as stated, must under all conditions be regarded as a pathological position." He says: The broad ligament of each side is a quadrangular fold of peritoneum, somewhat rounded off, the width of which nearly equals its length; that it extends in an approximately horizontal direction or at right angles to the perpendicular axis of the body, and carries between its blades most of the blood-vessels and nerves that supply the uterus. When such a fold, not over 7 to 8 cm. in length and nearly the same width, is twisted from one-half to three-fourths of a turn under continued tension, it is very evident that veins in its embrace will be constricted at some points, and will suffer from traction, if not from torsion, enough to impede the venous current. Thus a constant passive hyperemia and, sometimes, even a varicose condition is induced with trophic changes which result in catarrhal conditions of the mucous membranes, in follicular degeneration of ovaries, and in a generally diminished capacity to withstand infection.

In cases of descensus uteri, there is added to the evils of torsion of the broad ligaments just spoken of, the more pronounced factor of traction upon them in variable degrees. And to relieve the evils to involved veins and nerves, that arise from both traction and torsion of the broad ligaments, it is indicated to suspend effectively the uterus from above and to replace the cervix backward in the pelvic cavity, by shortening the sacrouterine ligaments. Such a suspension is best made by a substantial transplantation of round ligaments into the abdominal wall of the Gilliam type. This alone must be considered when pregnancy is possible; otherwise, it may be supplemented by ventrofixation in cases of prolapse. The shortening of sacrouterine ligaments may be made from above by laparotomy or by way of the vagina, either in the posterior culdesac or in front of the cervix. But aside from these more formidable cases, there is a smaller percentage of mostly younger patients in whom the uterus has settled down low in the pelvis in neither an anteverted nor retroverted position; its long axis being nearly parallel with that of the pelvic cavity. Torsion of the broad ligaments does not exist. However, the local symptoms and others are as pronounced as in the average case of retroversion without adhesions. They are best and permanently relieved by suspension of the uterus. During operation, in these cases, the excessive development of veins in the broad and ovarian ligaments will usually be found.

Types of these cases are young nulliparæ who have been given to coitus interruptus, and virgins who have become victims of masturbation. When by conditions of this kind, but more generally by retroversion or flexion of the uterus with or without adhesions, the normal competence of the veins involved has been lost, the disorder is best treated by not merely a surgical correction of the version, but by adding thereto an overcorrection in the sense of an efficient round ligament suspension of the uterus above the plane of the pelvic inlet. The ovaries in particular will, positively, be more comfortable and free from future disorders the higher they are located out of the pelvic cavity, but without direct fixation.

*Operations.*—1. *A curetment* is made in practically all cases. It consists of a sufficient dilatation of the cervical canal to use a loop curet of more than 1 cm. in width; this is preceded by a small spoon curet which cleans out the tube angles and the crevice extending transversely between them. After drying out the endometrium with a strip of gauze it is treated with from 2 to 4 c.c. of equal parts of tincture of iodine and alcohol, which is introduced to the fundus after renewed dilatation, with a syringe and swabbed



about with its cotton-covered nozzle. In young patients with simple cervical catarrh, we only scrape the cervical canal and apply 1 per cent. solution of nitrate silver; while in confirmed old gonorrheal cases the scraping act is preceded and followed by the nitrate of silver solution. In all these cases the cavity is finally packed with a strip of plain gauze, which remains forty-eight hours, chiefly to insure a thoroughly free cervical canal for drainage during the time that the intrauterine wound heals.

2. If the cervix is indurated, a frequent sequel to earlier cervicitis following lacerations, an amputation of 1 to 2 cm. is made by a flap method that guards against subsequent stenosis of the new external os. In cases of deep lacerations into the vaginal insertion, these deeper portions of the tears are closed, after their cicatrices have been excised by the Emmet technic, and the indurated lips are removed. The aim in this work on the cervix is to leave enough of the upper portion of the cervix to serve in subsequent gestation, and to remove as much as may be permitted of the indurated tissues in which are found the more deeply seated Nabothian follicles (retention cysts from constricted cervical mucous glands) from which carcinoma most frequently develops in later years.

3. Occasionally, when a marked cystocele exists, it is reduced, after detaching the bladder sufficiently, by imbricating the redundant vaginal flaps, after the outer surface of one side has been denuded of its surface epithelium enough to secure a plastic union with the undersurface of the opposing flap.

4. When needed, my fundamental intrapelvic perineorrhaphy(2) follows next.

5. *Abdominal Section.*—After severing adhesions, removing neoplasms when present, removing a tube and ovary or resecting them when needed, the round ligament of one side is caught in a forceps about 2 to 3 cm. from its origin, together with a generous fold of the enveloping peritoneum. This is unitedly severed by blunt dissection from the main portion of the broad ligament and is drawn up in a loop with special care to leave the tube untrammelled and not in danger of being drawn into the abdominal wall with the round ligament loop. The gap in the broad ligament is then closed with hemostatic stitches. When this loop has been formed on each side and all work on the adnexæ is completed, the subcutaneous fat is cleared away sufficiently from the aponeuroses of the recti near the lower end of the wound; a puncture is then made about 2 cm. away from the wound and about 3 cm. above the os pubis, with a thin and pointed artery forceps, through the aponeurosis, rectus muscle

and peritoneum; the prepared loop is caught directly from the bite of the first forceps and is drawn into and through the puncture wound until the distal portion of the round ligament and the fundus uteri are both drawn up against the abdominal wall. The loop is then fastened by mattress sutures in the abdominal wall and its projecting end is cut away. After the appendix vermiformis has been removed and epigastric structures explored with bare fingers, the abdomen is closed.

The aim in this operation is to leave no more space between the fundus uteri and the upper edge of the pubis than the bladder when full, will occupy, so that there be no vacant space or tract around the new uterine supports for the small intestine to become entangled, for laterally from the supports the space below is closed off by the distal portion of the round ligament drawn up against the front wall. Aside from a suspected temporary intestinal embarrassment during the second week, in one of my first cases treated in this way, I have never had occasion even to suspect such a sequel. No criticism against the operation, performed in this way, will stand on the ground of the possibility of inviting intestinal obstruction as being anything but imaginary.

The advantages of this procedure over the numerous other methods of implanting the round ligaments extraperitoneally into the abdominal wall, called internal Alexander operations, are: (a) It produces a higher and more stable suspension of the fundus uteri; because the enveloping peritoneum is freely used to reënforce the strongest portion of the round ligament, and the traction is made directly forward, instead of in a more lateral and circuitous route. (b) In order to draw the liberated round ligament extraperitoneally into a specially made channel between the various layers of the abdominal wall, as a substitute for the inguinal canal, it must be divested of its peritoneal coat for some distance; and this is often not possible on account of connective-tissue infiltration from previous inflammation, and, therefore, this technic will not be available for the worst cases.

In those cases where the cervix descends far forward in the vagina, it is retroponated by stitching loops, with linen or silk, in the sacro-uterine ligaments near their attachment to the cervix, before the round ligament loops are implanted into the abdominal wall. In those multiparæ with a relaxed abdominal wall from separation of the recti, the membranous web between them is exsected and the muscles with their aponeuroses are united in the median line. In cases of excessive fat within the abdominal wall, this is reduced by taking

off semielliptical or wedge-shaped masses, on both sides before closing the abdominal incision. A pessary is never used after this operation.

In making reports of the results of retroversion surgery in the past, namely, four times<sup>(3)</sup> for my bi-inguinal or extended Alexander operation, I have maintained, that both the subjective and objective findings in each case must be carefully obtained in order to accept it as of full clinical value. A mere statement of a patient about what she knows and what she thinks of her state of local and general health, is of some value and may be accepted for what it is worth, like circumstantial evidence in court. But a careful examination two years, or more, after the operation is the important requirement for obvious reasons—to supply direct and positive evidence in the court of science.

The cases comprised in this report were practically all private patients. A good share of them, when leaving the hospital, promised to present themselves after an interval of two years, or more, for examination. Previous experience in four successive “round ups” of patients for a similar purpose has suggested this. Therefore, I have succeeded in making an examination in 127 cases, with only thirty-seven cases heard from by letter, out of a total of 251 patients upon whom this particular method was employed during the five years covered by this report. A small number having been treated by my former bi-inguinal or extended Alexander method, chiefly when some impending or fully formed inguinal or femoral hernia was waiting for an incidental cure. In these cases the vermiform appendix was either omitted or taken out by a separate McBurney incision at the time. Of the remaining eighty-seven cases nothing could be found.

Among the total number occurred the following deaths: There from embolism: (a) A multipara, forty-one years, fairly nourished. She had a curetment, amputation of the cervix, laparotomy for removal of left tube and ovary and appendix, resection of right ovary, and a round ligament suspension of the uterus. This patient left the table in good condition, made a smooth convalescence and felt well enough to get up after seven days, when she suddenly died in twenty minutes of an unknown cause. (b) A slender virgin, twenty years, domestic, not anemic, and a normal heart, had a curetment, laparotomy with resection and suspension of one ovary, round ligament suspension and appendectomy performed, without the least shock or hemorrhage. She awoke from the operation with unusual restlessness; but her condition was very satisfactory until eight hours later

when, after shaking hands with visiting relatives and assuring them of her good condition, she died without apparent cause inside of half an hour. (c) A para-ii, forty-three years, fairly nourished. The operation consisted of a curetment, amputation of cervix, perineorrhaphy and a laparotomy for exsection of both tubes and round ligament suspension of the uterus. There was no undue loss of blood, no shock. Convalescence uninterrupted until the tenth day, when she died in thirty minutes. (d) A case of peritonitis due to a leak of the bladder from accidental injury the result of many ligations made specially to obliterate unusually large and numerous veins in the broad ligaments. I have since then abstained from such special ligating of veins, because it is unnecessary, when the uterus is drawn up high. (e) A case of acute dilatation of the stomach which was not relievable by lavage nor by changing the position of the patient. The general toxemia following was partly manifested by a comatose condition for three days before death.

In all the cases subjected to the round ligament suspension, neoplasms of the uterus and of the ovaries were removed in nearly 7 per cent. Prolapse of the uterus was present in a little over 8 per cent. In nearly all of these cases the sacrouterine ligaments were shortened. A curetment was made in nearly all cases. Amputation of a pathological cervix was done in 17 per cent. Perineorrhaphy in 23.5 per cent. The Emmett trachelorrhaphy and anterior colporrhaphy were each performed in only two cases. Marked adhesions to either uterus or appendages were present in over 15 per cent. A tube and ovary of one side were removed in 29.5 per cent. Both tubes were exsected and removed, usually with one ovary, in 12 per cent. One ovary was resected in 45 per cent. Both ovaries resected in 19.5 per cent. Salpingostomy was made, mostly on one side, in only 4 per cent. of all cases. The vermiform appendix was removed in 87 per cent. Pathological conditions of varying character were present in more than half of these cases. Appendicitis obliterans was found in a few cases only. Cholecystostomy and epigastric exploratory incision were made several times.

*Results in 127 cases examined and thirty-seven reported by letter*, after an average observation period of three years, seven months and ten days. Among these 164 cases, twenty-two became pregnant. Of these fifteen were examined. Four of these aborted, in one case due to a railroad accident. In all of these the position and condition of the organs and the pelvic and general health are good, except that one of the fifteen is pregnant two to three months with organs in good

position, but has pulmonary tuberculosis. The remaining ten of the examined cases gave birth to thirteen children. One of these had two severe forceps deliveries with severe infection the second time and a resulting return of retroversion and bad lacerations. The eleven other labors in nine patients were normal aside from two breech presentations. The position and condition of their pelvic organs and their pelvic health is ideal, and their general health is rated as good or excellent. Of the seven cases of pregnancy, "reported by letter," each had one child with normal labor; and one reports as "health improved," but all the others report as in good or excellent health.

The total number of pregnancies was twenty-five, of which four aborted. In every one of these 127 cases examined, except two, the uterus was in ample anteversion to be driven forward, invariably, by intraabdominal pressure, even in the recumbent position. In about 7 per cent. of these cases, however, some minor defects or departures from the normal were found, due either to elongations of the sacrouterine ligaments, so that the cervix, descended in the vaginal canal too far; or due to anchoring of the round ligaments too far away from the symphysis pubis so that the fundus, although it was up near the abdominal wall, was not in as good anteversion as it would have been with a lower implantation. These mistakes have not occurred in my later work. In two cases (1.6 per cent.) there was a return of displacement for ample cause; in one, from overdistention of the bladder for two days after operation; there was also a primary infection of the wound; in this case the uterus was down when the patient left the hospital; the other case is one above reported among the results of pregnancy. In sixty-one of the examined cases, or 48 per cent., the *condition* of the uterus and appendages is so ideally good, subjectively and objectively, there being no pains or aches or abnormal discharge at any time. The term "excellent" may be properly applied to these cases. In fifty-one of the examined cases, or 40 per cent., the *condition* of these organs is objectively good, and the patients consider themselves well in those parts; but they have minor pains and, at times, leukorrhea. They are, therefore, classified as "good," while in fourteen, or 11.2 per cent., of them these symptoms are more pronounced. They are not disabled for their occupation, but are classified as "improved." In one of the examined cases, 0.8 per cent. the operation was done for a pronounced retroversion in a young lady with beginning melancholia. Her pelvic symptoms were improved, but the mental derangement continued and later became worse. I class this case among the unimproved. Likewise among the thirty-seven cases whose report, by letter, has to be accepted, there is one case of marked neuras-

thenia, that does not admit having derived any benefit from the operation; this makes two cases, or 1.6 per cent., of all the reported cases as subjectively unimproved although the displacements are cured. After deducting the seven pregnancy cases, reporting by letter, as in good or excellent health, the twenty-nine remaining letter cases reported as follows: Ten, pelvic and general health "excellent;" fifteen, general health "good." One has good pelvic health, but has a ventral hernia; one, good health except for tuberculosis; two do not admit having been benefited, because of prolonged scanty menstruation or amenorrhea.

#### CONCLUSIONS.

(1) Retroversion of the uterus *per se* is an anatomical anomaly that gradually produces discomfort and has an inherent tendency to invite more serious displacement or inflammatory processes in the uterus and more so in the ovaries. Those who deny this, affirm it by their own action when they correct this displacement, incidentally only, while claiming to be operating chiefly for its complications. (2) The evil effect is produced by the embarrassment to the venous circulation, caused by torsion of the broad ligaments and by traction in descent of the uterus. (3) Clinical observation and experience indicate that the competency of the veins in the parametrium becomes impaired by the impediment when it is severe or long enough. With such a condition liable to be present, the best clinical results are obtained by not merely correcting the version of the uterus, but by adding also an overcorrection in the sense of a harmless suspension at a higher level than it normally occupies within the true pelvis. (4) One of the best operations to accomplish this is the Gilliam operation, provided that a generous amount of the enveloping peritoneum is utilized to reënforce the round ligament loops, which must be anchored in the recti muscles and their aponeuroses not more than 3 to 4 cm. from the border of the symphysis pubis, and should be drawn up so that the peripheral, unused, part of the round ligament and also its uterine origin come into apposition with the abdominal wall. (5) The efficiency of this operation is shown in the 127 examined cases, including the double test of pregnancy of twenty-one cases, all of whom experienced natural labors, with a return of displacement in only 1.6 per cent., with both pelvic and general health "good" or "excellent" in 88 per cent. There was improvement in 10.2 per cent. and no improvement in only 1.6 per cent. out of a total number of 164 cases observed from two to seven years, or over 3.5 years on an average. Its harmlessness is shown by the utter absence of any deleterious effect in the twenty-one births noted; likewise, from the absence of intestinal complications and other discomforts.

2120 CLEVELAND AVENUE.

## SHORTENING OF THE ROUND LIGAMENTS BY TRANSVERSE SUPRAPUBIC INCISION.\*

BY

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Cincinnati, Ohio.

(With eleven illustrations.)

At the meeting of the Mississippi Valley Medical Association, held at Cincinnati, October 29, 1914, it was my privilege to present a paper on the operation about to be described. Since then I have come to realize by experience that the steps of the same could be simplified. For this reason, and the fact that it has given me such

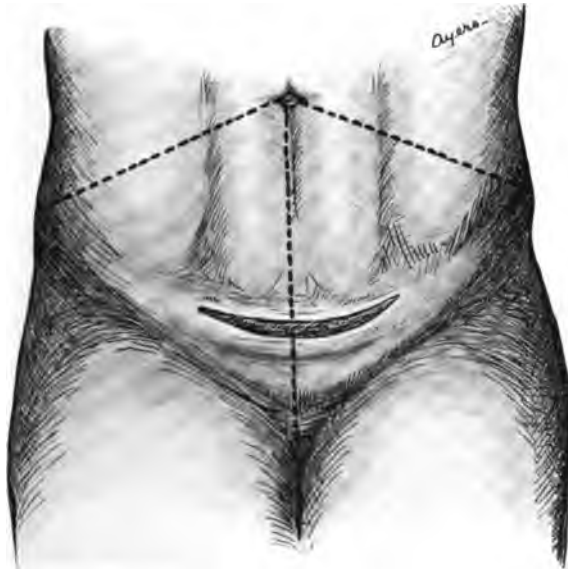


FIG. 1.—Shortening the round ligaments by transverse suprapubic incision.

satisfactory results in curing retrodisplacements of the uterus and holding the organ in perfect suspension after the usual operations upon the cervix and outlet in cases of complete prolapse, do I assume the liberty of presenting the subject for your consideration.

The adage, "there is nothing new under the sun" is applicable now. The operation presents features embodied in many different methods, but in its purpose and ensemble presents sufficient essentials to entitle it to individuality. The principal feature though is a

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

Goldspohn derivative and consists in the inguinal liberation of the round ligament from its peritoneal investment to the necessary degree. The transverse suprapubic approach is that of Duret, Peterson, Rumpf, Palm, Küstner and many others. I have always been partial to the Goldspohn procedure and up to the autumn of 1913 employed it in a routine way. I did not limit the Goldspohn operation to uncomplicated retrodisplacements, but successfully employed it in those complicated with adhesions and tuboövarian disease, performing salpingectomies, oöphorectomies and conservative operations upon these organs, also frequently removing the appendix as a necessary or prophylactic measure. It was at such times

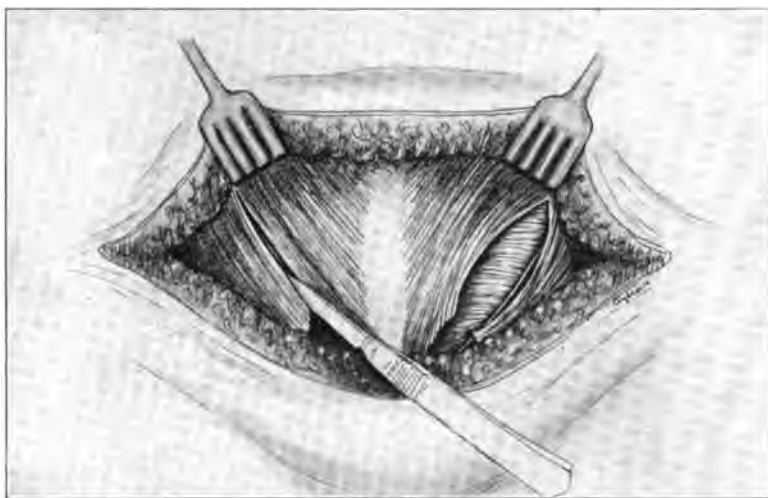


FIG. 2.

that I was frequently apprehensive because of bleeding in the depth and the greater difficulty of the operation and wished that I had made a median incision. In order to more readily cope with these possible contingencies, I took recourse to the transverse suprapubic incision, which in case of need could be terminated in the Pfannenstiell manner or even by the Peterson median incision after slight dissection of the upper wound flap from the underlying fascia.

A transverse incision down to the fascia is made just above the pubes and then carried upward on either side to correspond to the direction and length of the inguinal canal. Hemostasis is attended to and all attached fat in the line of the future fixation of the round ligaments is removed from the fascial surface. An incision about



five centimeters in length is made through the aponeurosis of the external oblique in the direction of its fibers and corresponding to the inguinal canal.

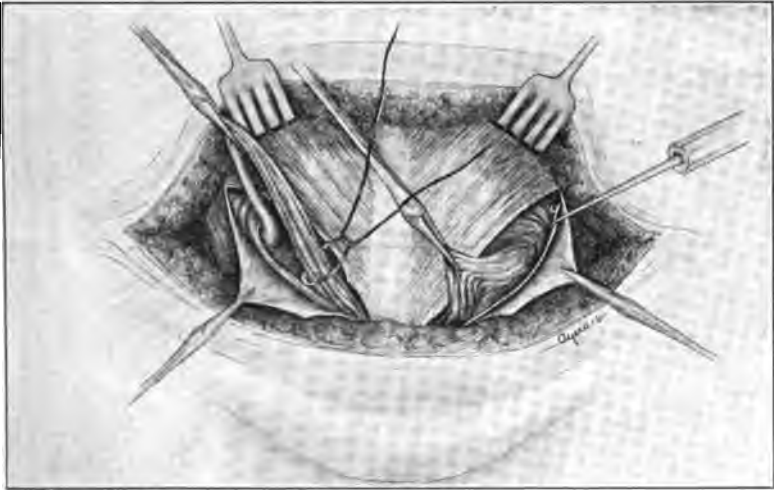


FIG. 3.



FIG. 4.

The round ligament is caught up in a hemostat, completely liberated from its bed, a ligature passed about its distal end and then sectioned immediately above the ligature. By making traction on the

ligament in an outward direction with the assistance of the hemostat its peritoneal reduplication is brought into view. This is snipped into with scissors and the incision continued along the ligament on

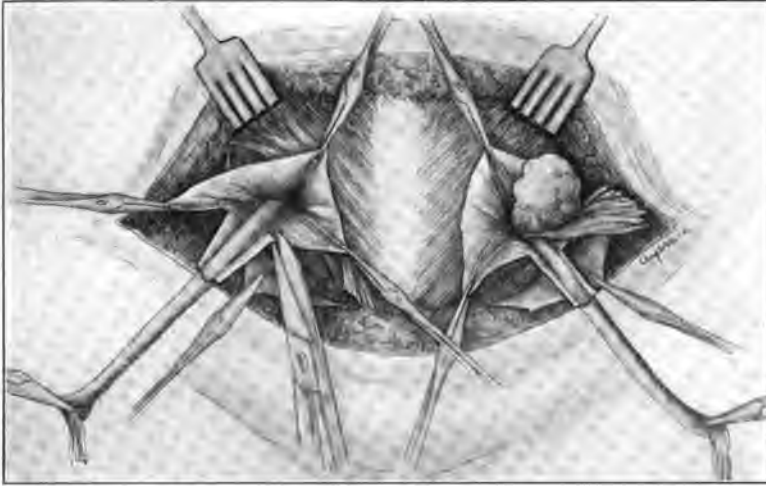


FIG. 5.

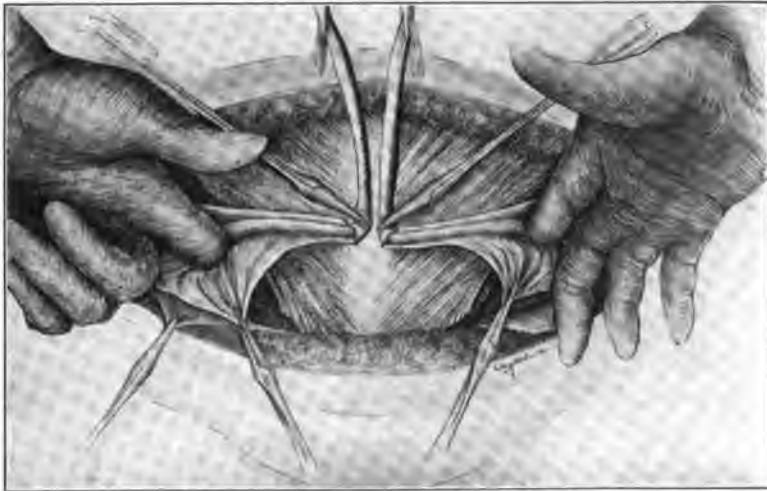


FIG. 6.

either side to the desired height, and the same procedure is then carried out on the other side. The index finger is then inserted into each opening for the purpose of exploring the pelvic organs and to

determine the amount of slack that must be taken up in the round ligaments while the assistant makes traction upon them. In order to fix this, a hemostat is placed upon each ligament at the point of its

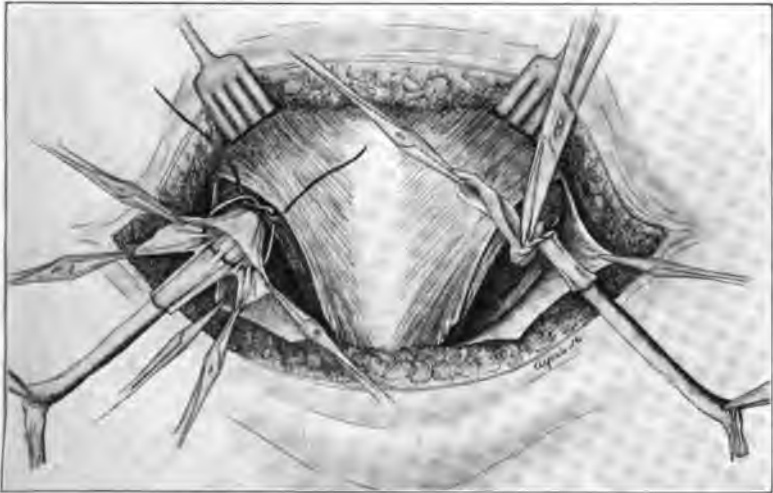


FIG. 7.

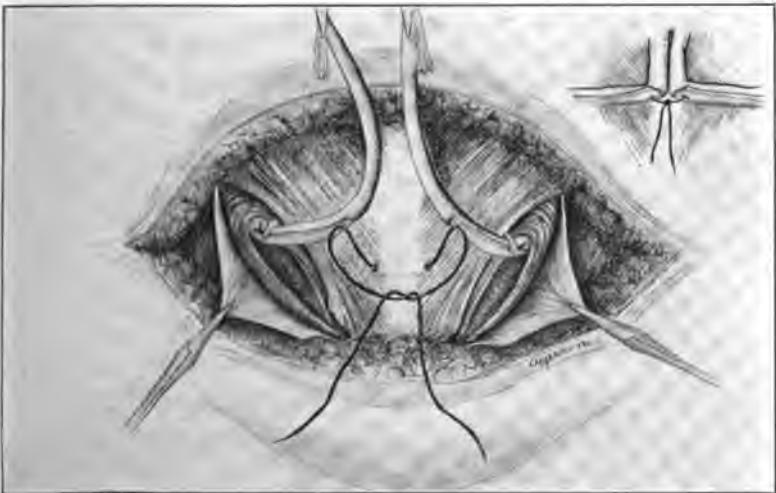


FIG. 8.

excess. If no grave pelvic condition is present and the amount of shortening has been determined upon, the peritoneal opening is closed. This is accomplished by catching its borders on either

side as far up on the ligament as possible with a hemostat, transfixing one side low down with a catgut suture which then passes through the upper surface of the round ligament and finally includes

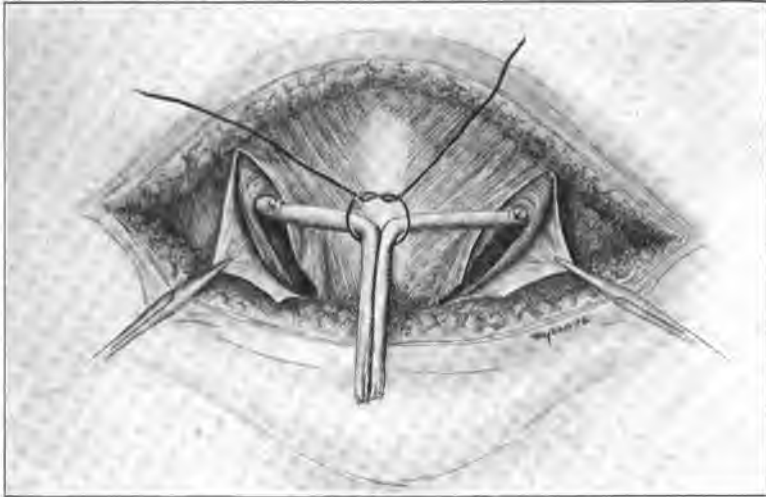


FIG. 9.

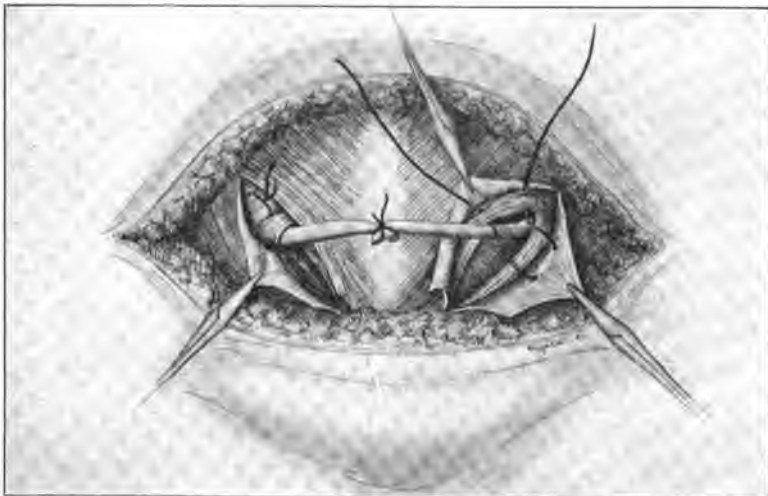


FIG. 10.

the peritoneal edge adjoining. The suture is tied after passing behind the hemostats holding the peritoneum and the excess of peritoneal tissue snipped off. The round ligaments are then fixed

just above the pubes in the median line by passing a suture through one, transfixing the abdominal fascia and carrying the suture through the other ligament and tying and then passing the ends forward underneath the fixation hemostats, thus completing ligation of the ligaments, the surplus of which is cut off. To guard against any possible weakness at the site of the internal ring, the conjoined tendon is fastened to Poupart's ligament by suture. As is my custom when operating for hernia, I employ the reverse mattress suture for this purpose, for the reason that no suture material is interposed between muscle and ligament and a better coaptation is obtained.

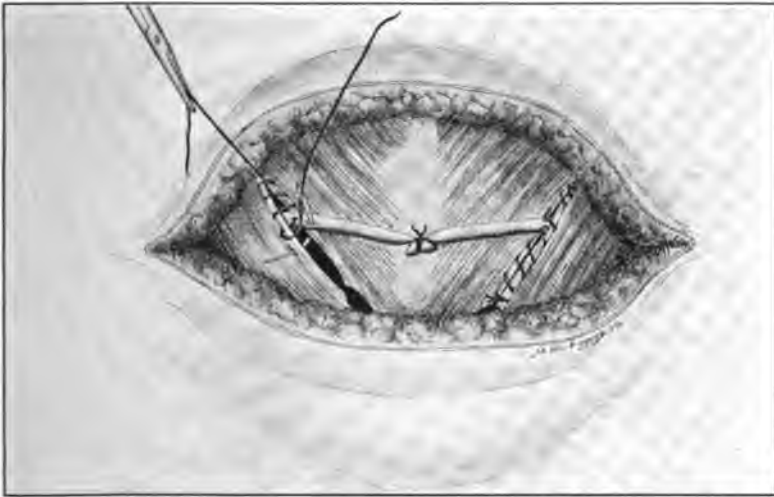


FIG. 11.

The operation is completed by separate suture of the external oblique aponeurosis and suprapubic wound, the suture of the aponeurosis including the borders of the round ligaments.

Should the examining fingers which have been introduced into the abdomen detect the existence of serious adhesions, tuboövarian disease or other complications, the median incision of Peterson may be resorted to or the lower ends of the external oblique incision joined by a transverse fascial incision and the abdomen opened in conformity with the procedure of Pfannenstiel. Disturbances within the pelvis are eliminated and the abdomen closed according to the method peculiar to the Pfannenstiel incision. The round ligaments are then attached to the fascia in the manner previously described.

A few of the cases in my series belong to the complicated class, having been associated with pyosalpinx, ovarian abscess and extensive adhesions. It is particularly in this class of cases that the value of this procedure becomes evident, as it enables you to readily cope with complications very difficult to overcome with the bi-inguinal incision.

Additional advantages are to be found in the greater ease with which the round ligaments are exposed, the greater rapidity with which the operation can be performed, the employment of a single incision, and the fact that the best part of it is hidden by the pubic hair, and that the pull is in a forward, in place of lateral, direction.

In going over the literature on the subject I found that invariably when the transverse incision was employed the operator did so with the premeditated intention of entering the abdomen and employing for this purpose either the Peterson, Pfannenstiell or Liepman incision. The only exception to this is in those obsolete methods where the operators (Doleris, Casati, Duret) sought to modify the original Alexander-Adams operation without its Goldspohn modification, without which to my notion the Alexander operation is worthless.

In the operation just described the purpose is to avoid this aggression unless demanded, and in that event to be prepared through the character of the incision for such a contingency. The fixation of the ligaments to the fascia in the midline in place of to Poupart's or the fascia in the line of the inguinal incision and other features embodied in the technic are further apologies for the essayist's encroachment upon the time of the Fellows of this association.

11½ E. EIGHTH ST.

#### DISCUSSION OF THE PAPERS OF DRS. GOLDSPOHN AND STARK.

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—This is a very interesting subject and has been presented to us from two points of view. I have had quite an extensive experience with the Gilliam operation. I have been performing it since it was first brought to our attention by Doctor Gilliam, and I have reported my results, which tally very closely with the percentages of recoveries that Doctor Goldspohn has secured.

All will remember twelve or fourteen years ago how Doctor Goldspohn vigorously advocated the Alexander operation, for which he was severely criticised. The contention was that if there were lesions in the pelvic viscera he could not correct them through this incision, but later he saw the error, and now makes a free opening and corrects all pathological conditions found in the abdomen.

In all my cases, there has been but one recurrence, so far as I know, and that was in a woman who gave birth to a child in which there was an occipitoposterior presentation; the head of the child was with difficulty rotated with forceps, and after two months her doctor brought the patient to me and I found the uterus retroverted. It is the one case of failure I have been able to find.

DR. MAURICE I. ROSENTHAL, Fort Wayne.—I have given the question of retroversion of the uterus considerable attention in the last fifteen years, and it has always occurred to me that those operations which depend entirely upon the round ligament for the proper ante-position of the uterus are faulty because they are not physiological. Now, all things being normal, nature holds the uterus in its proper position beautifully and simply, and I believe our whole trouble is that we do not understand the physiology of the proper ante-position of the uterus. One would be led to believe from the description of all these operations, that when you open the belly the round ligaments are two ropes that are tied, one end to the cornu of the uterus, and one end to the pubic bone in some way. We all know that this is the position of the round ligament when we open any normal belly. (Illustrating on blackboard.) There is no need of tension. Early in my history I opened two bellies where the round ligaments were so atrophic that I could hardly find them, and yet these women had their uteri in proper ante-position, and I believe that any operation that depends upon the round ligament solely is faulty because it is not physiological, and after twelve years of such experience as Dr. Goldspohn has given us, with such a thorough analysis, reporting hundreds of cases which he has followed from the time of operation and through pregnancy, he has receded from his operation, and I predict that in twelve years from now he will recede again because the operation is not based upon physiological conditions as we find them in nature. After a reasonably large experience with the operation I have done, it has led me to believe that my observations have been probably correct. The ante-position of the uterus is maintained by the nice delicate balance between the round ligament and the overlying peritoneum which covers the round ligaments, the bladder, the uterus, and back upon the rectum, and this nice balance results in a condition which I am going to demonstrate. (Illustrating on blackboard.) Let us say we have at this point the uterus, here the bladder, here the Douglas' pouch, and here the peritoneum. It is a matter of mechanics. The uterus is lifted forward by pressure on the peritoneum over the round ligaments as it reflects forward from the uterus and broad ligaments causing the round ligaments to bow outward as we find them in normal individuals.

DR. CHANNING W. BARRETT, Chicago.—Dr. Goldspohn's principles as set forth ought to be accepted at a gynecological meeting as a standard of efficiency. There are those who say that retrodisplacement is normal; that the uterus can be in any position, but they are not usually the men who have made a study of the subject. I repeat that his principles of support and principles of correction

ought to be accepted by this body. We might differ upon points of technic.

Dr. Goldspohn laid down principles many years ago and taught us a certain method of extension of the Alexander operation, which was very much of an improvement over the Alexander operation because of the cases that needed correction of complications, but he found complications extensive enough to give up the operation. We now have a method presented in Dr. Stark's paper that has all the objections of Dr. Goldspohn's method with a few added. I did the Goldspohn procedure for a number of years, and I much prefer it to the technic offered by Dr. Stark. I should feel that if I went back to the technic presented by Dr. Stark according to the description given, I would be going backward fifteen years. This talk about the round ligament not holding the uterus because they are not on tension is not tenable. Nothing is on absolute tension in the abdomen. We cannot say the mesentery does not hold the intestines because it is not drawn taut. We cannot say that the guy-rope of a tent does not exert traction because we do not find it drawn absolutely taut. There are other forces at work. There is the force of gravity of the rope, and the wind blowing the rope, and that may carry it in one direction or another. Nature says that these ligaments have an influence. Nature said it over again, so that finally animals that get somewhat in the upright position develop a little of the round ligament. In the human being, in whom the upright position is maintained, we have the greatest development of the round ligament. Nature said it was necessary that the uterus be anteverted and developed this ligament, which is the development of the upright position to drag the uterus forward, and it does that regardless of the fact that we do not find it in an absolutely taut position.

DR. GOLDSPOHN (closing).—To add a few things I forgot in reading my paper. It is very important that the anchorage you make of the round ligaments is not over 3 centimeters above the upper border of the symphysis pubis. In my earlier years I did not know that and some of the cases are not so satisfactory. There is no retroversion, but the uterus will not stand so well anteverted.

I will say in regard to the primitive Alexander operation, which professed not to invade the peritoneal cavity, I have never had any use for that ideal of superficiality; and I condemn it now. It is outside of the limits of all thorough ideas of work. But I will do a thorough bi-inguinal laparotomy via the inguinal canals without cutting anything else than skin and superficial tissues in patients who also have either a hernia or a disposition to one, either inguinal or femoral; because in closing that incision correctly I can cure these hernias at the same time. I can see no advantage in Dr. Stark's technic over my bi-inguinal operation; because, like the latter, it does not enable him to remove the appendix and to explore the general abdominal cavity. For that reason I do the bi-inguinal operation only rather exceptionally. I often want to explore the gall-bladder, common duct, pylorus or the kidneys, in addition



to the routine removal of the appendix vermiformis in cases of this kind. We can do all this if we have a median incision. I have done a number of these operations by the transverse Pfannenstiel incision and anchored the round ligaments at the ends, but I do not like it. In the first place, the Pfannenstiel incision must be made quite low down if good anteversion of the uterus is to be secured, and then it does not provide good access to the appendix, unless the latter hangs down into the pelvis. In most cases it is an inconvenient if not an unsafe approach; and occasionally the appendix is found high up. I have had three cases where I removed the appendix from a point as high up as the normal position of the hepatic flexure of the colon, where the normal evolutionary migration of the colon had not been completed and the appendix had been left up at a high point. I had to extend the abdominal incision considerably in order to reach it.

The argument of Dr. Rosenthal strikes me forcibly as being such as I have heard in court. When an attorney has a bad case and has no logical argument to advance, he will put up a theory, and with a good deal of oratory will endeavor to make an impression, but the thing does not count in the end. I have never spoken of the round ligament as normally holding the uterus forward. I have never declared that I believed that the round ligament has either this or that function physiologically; but there is no reason under the sun why we should not give it a function when we have so good a reason for doing it harmlessly and changing its course from a lateral one to an anteroposterior one.

DR. STARK (closing the discussion).—I would like to go on a little bit where the previous speaker left off. I would consider it an imposition upon the intelligence of this audience were I to think anybody present believed that the round ligament had anything to do with the suspension of the uterus. I consider it entirely superfluous to discuss that phase of the subject but as the previous speaker has said, that is no reason why it should not be used as a guy rope to hold the uterus in proper position. If we were so placed as an engineer whose engine is out of order and could definitely locate the site of trouble, and remedy the same by correcting the obvious fault that would be a different matter, but you all know that we have not arrived at a definite conclusion as to what the physiological supports of the uterus are. The three commonly accepted factors are intra-abdominal pressure, the ligamentous structures and the pelvic outlet. I believe that most of us are satisfied that intraabdominal pressure has nothing to do with the maintenance of the uterus in normal anteversion and flexion. We have retroversion of the uterus in women who have perfectly normal intraabdominal pressure.

The same is true of the pelvic outlet. We commonly find the uterus in normal position with a complete tear at the outlet. The probability is, that the factor that is responsible for the maintenance of the normal position of the uterus is the proper balance in the connective tissue plane of the uterus, the so-called retinaculum uterinum of Martin which surrounds the cervicouterine junction and ex-

tends forward, backward and laterally to constitute the pelvic fascial plane. My belief is that posterior displacement of the uterus is principally due to a congenital or traumatic deficiency of the posterior fasciculi of the pelvic fascia. About a year and a half ago Reynolds directed our attention to the influence exerted by a defective anterior fascial plane upon the cervix, displacing it forward and thus favoring posterior rotation of the fundus, which I have also frequently been able to verify.

I am sorry, gentlemen, you cannot see the purpose of this modification of the Goldspohn operation. I am sorry, too, that Dr. Goldspohn departed from his operation, because he introduced one of the most valuable surgical innovations that any member of this Association has brought before us, and some day posterity will recognize it.

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## THE PATHOLOGY OF THE MAJOR VESTIBULAR DUCTS AND GLANDS.\*

BY

JAMES E. DAVIS, A. M., M. D.,  
Detroit, Mich.

(With twenty-six illustrations.)

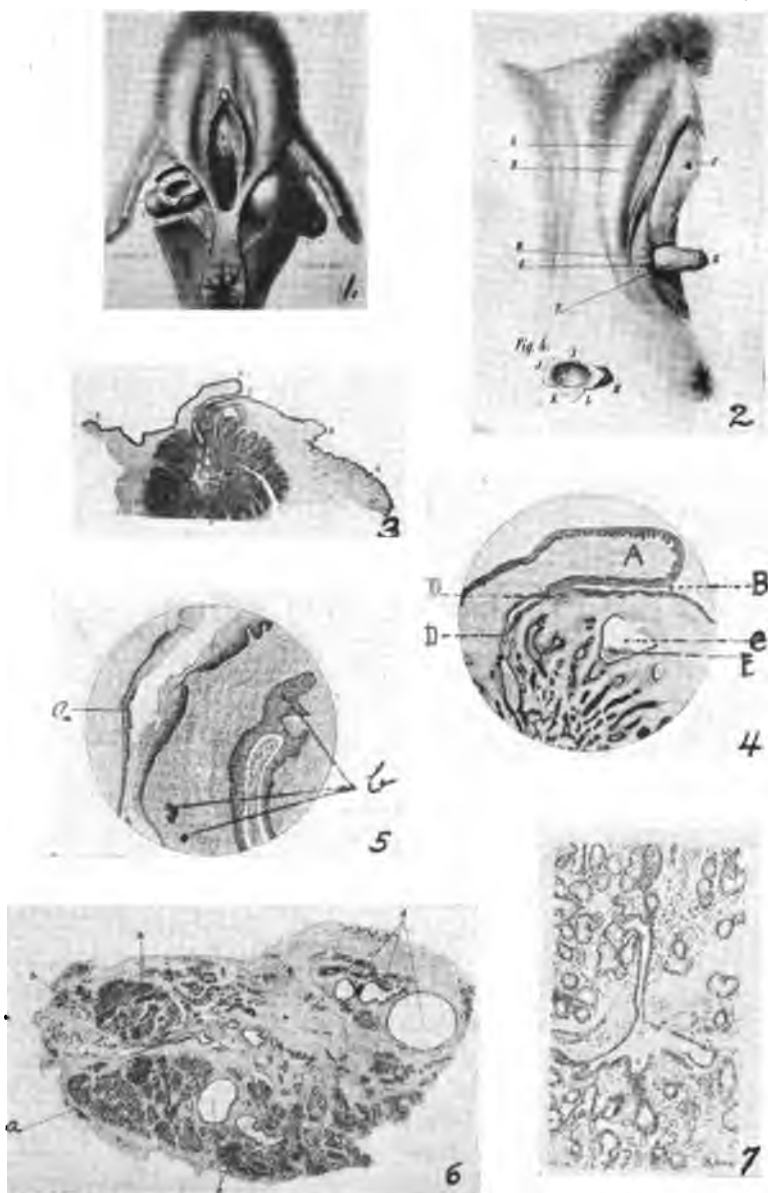
*Historical.*—The earliest reference to the secretions of the vestibular glands was made perhaps by the old Greeks, Pythagoras, Hippocrates and Galen, who wrote of the outpouring or ejaculation of seminal secretion by many erotic women.

As early as 1621 Plazzoni had observed the openings of the ducts of the major vestibular glands. In 1627 Spigelius made a similar observation. Rhodius, in 1661, Rolfine in 1664, and de Graaf in 1672, also made similar observations of the duct outlets. Some of these authors described or observed the emptying of a clear fluid from the ducts.

Guichard Duverney was the first to successfully demonstrate a particular similarity of openings from the ducts of the right and left glands. This observation, however, was made in the cow. He shared his find with his friend and student, Casper or Caspard Bartholinus (Bartholinus II) of Copenhagen, who was then stopping in Paris. There were three Bartholini of Copenhagen, all of whom were celebrated anatomists, and all were liberal contributors to medical literature. They were Caspard I, Thomas his son, Caspard II, son of Thomas and grandson of Caspard I. They were Danes by birth but Cosmopolites in their residence, studies and knowledge of languages, being fond of travel and quite at home in Germany, Italy and France. Caspard II was born in Copenhagen in 1655.

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

In 1674, when but nineteen years old, he received from the king the honorary appointment as Professor of Philosophy at the University. For the next three years, he studied physics and anatomy at various universities in Europe, and in 1677 began to lecture on these subjects in Copenhagen. He was led by the celebrity of Duverney of Paris to go to that city and complete his medical education, but especially to enjoy the advantages afforded for the study of anatomy under this celebrated teacher who had graduated at Avignon when only nineteen and was, at this time, under twenty-eight years of age. Here, Bartholinus graduated with the degree of Doctor of Medicine in 1678. But before obtaining his degree he published at Rome in 1677 his little book, "*De Ovariis Mulierum et Generationis Historia*," in which appears the first account of the racemose glands which bear his name. This work was republished in Amsterdam in 1678, in Neurbaum in 1679, and in Lyons in 1696, but is at the present time one of the rare many works of the three Bartholini. In 1680, Bartholin, while studying in Firenze Osp. S Maria Nuova, found a corresponding gland in a female corpse and observed there the sticky, slimy nature of the secretion. For nearly a quarter of a century he continued his studies in anatomy, lecturing regularly on this subject and on physics at the university, but in 1701, he practically retired from professional work having become greatly interested in politics. He died in 1738. Caspar Bartholin described the duct, also called ductus major Rivini and the gland (glandula vestibularis major) which is called by his name. The discovery of these structures is sometimes, however, erroneously credited to his father or grandfather. Duverney, himself in 1701, Haller, and others confirmed the correctness of Bartholin's contribution. In 1706, Morgagni contributed new knowledge of the structure of the glands and in 1775 Santorini pictured the gland apparatus. In 1745, Haller entirely denied the existence of these ducts and glands for he could find only the openings of the ducts which he plausibly considered from the mucous glands. Upon Haller's authority these glands were soon forgotten, but Sabatier in 1791, Guthrie in 1834, and Taylor in 1838, revived them again. But it was really Tiedmann's thorough work in 1840, done at the instigation of Fricke, which again re-established the glands and their meaning. In 1842, J. Heiberg made a very careful research of the glands and their very dilatable excretory ducts. In 1840 Boys de Loury, and in 1841 Vidal, made surgical mention of cysts and abscesses of the labia majora, but they did not clearly differentiate the cases so as to make their records of value. There had been some cases of vulvovaginal gland disease



FIGS. 1 to 7.

observed by Graaf, Morgagni, Boerhaave, Hunter, Astruc, Cruveilhier, Robert (M) and others. The earlier writers grouped all the venereal diseases under the general term of pox or syphilis, but for a century and a half there had been no significant anatomical or pathological work on the glands of Bartholin. The most exhaustive and thoroughly scientific work upon the glands and their ducts appeared in two contributions by Charles Pierre Huguier in 1850 and 1852.

The work of Huguier was entitled "Memoire sur les maladies des appareils secreturs des organes genitaux externes de la femme,"

FIG. 1.—(Redrawn from Huguier's Mémoire.) The relation of Bartholin's glands to the vagina. *a, b*, Duct on the right side is occluded and cystic, forcing the gland which is enlarged further out than usual. The duct on the left side is markedly cystic. The glands ordinarily are in the adipose tissue just external to the vagina and are partially covered by the band of muscle shown in the drawing. The glands are shown in close proximity with the pubic rami, and slightly posterior to a line drawn from the posterior commissure.

FIG. 2.—(Redrawn from Huguier's Mémoire.) The gland and part of the duct which is cystic have been dissected out, the gland being entirely freed but the duct is shown still partly attached. *A*, Labium majus; *B*, labium minus; *C*, urethral orifice; *D*, Bartholin's duct; *E*, sulcal tissue pulled outward between the labium majus and minus; *F*, the outer margin of the gland.

FIG. 3.—(Magnification two diameters.) This section is cut through the whole of the duct and carcinomatous growth which is primary in the gland as shown in Figs. 3, 4, 5. A portion of the tumor is removed from the *F* side and there is a crack in the growth due to an incision during the fresh state. *A*, The labium majus; *B*, the labium minus; *C*, the gland duct; *D*, the hymen; *E*, vaginal wall; *F*, carcinoma.

FIG. 4.—(Magnification thirteen diameters.) A microscopic section showing a longitudinal section of the duct. The stratified epithelium is distinctly seen but in places it is very thin. The duct proper is seen throughout but the innermost parts of the duct are seen merging with the cancer tissue. *A*, Hymen; *B*, duct orifice; *C*, a cystic area; *D, D*, areas of epithelium which are very thin; *E*, mass of cancer cells.

FIG. 5.—(Magnification fifty-six diameters.) This section is a part of the tissues in Figs. 3 and 4, showing a deep part of the duct with one large and two small masses of carcinoma cells. The inner (left) wall of this part of the duct is lined above with stratified epithelium and below the middle with well-marked columnar epithelium at *A*, and at the bottom with one or two layers of cuboidal epithelium; the outer (right) wall is lined above with stratified epithelium, then for a small distance by columnar epithelium, and below again by stratified epithelium, which appears thick owing to obliquity of the section; the cells are vacuolated and have desquamated below. A large mass of cancer is seen on the right of the section, with columnar or cuboidal peripheral cells and degenerated central cells lying in a cavity. Two smaller masses of cancer are also seen, and marked round-cell infiltration at *B*.

FIG. 6.—(Magnification nine diameters.) A section through the entire Bartholin gland. *a* gives a clear idea of a lobule composed of many small glands and partially separated by stroma from the neighboring gland elements. At *b* are sections of the lobule's terminal duct. At *c* and *d* are sections of larger ducts.

FIG. 7.—Terminal ducts in Bartholin's glands. *a* is a secondary duct dividing into four terminal ducts. These are lined by cuboidal epithelium. At several points the small glands are seen opening into these terminal ducts. The appearance of many layers of cells at *b* is due to the obliquity of the section. The major number of the glands are tubular. The gland epithelium is high cylindrical with the nuclei at the base.

and covered a research upon thirty-five women and twenty-six children during a period of nine years, 1841 to 1850. Huguier

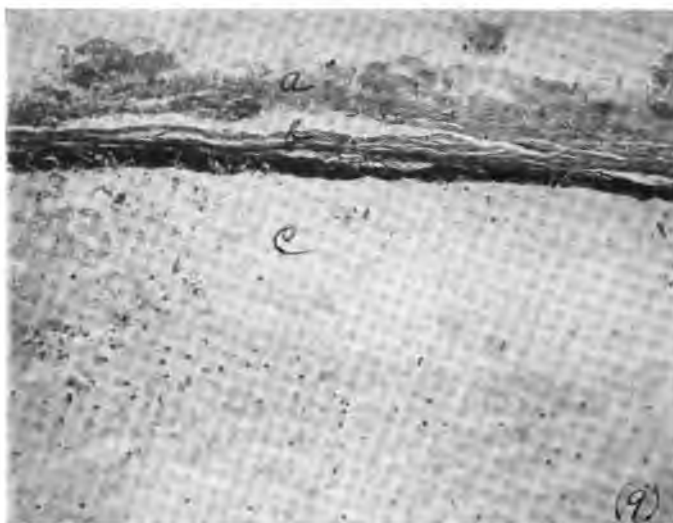
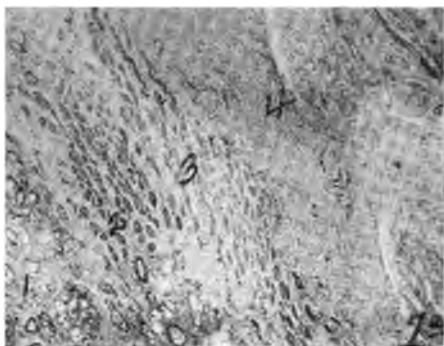


FIG. 7a.—(Magnification sixty-four diameters.) At 1 is shown the conglomerate gland structure. At 2 unstriped muscle fibers. At 3 striped muscle fibers. At 4 connective tissue.

FIG. 8.—(Redrawn from Huguier's *Mémoire*). A cyst of the left Bartholin duct. A probe is shown in the urethral orifice. At *a* is the cyst separated and pulled out from the gland turning the inner end outward. Fig. 2 shows the cyst with severed duct openings. Fig. 2 bis shows the cyst laid open.

FIG. 9.—The wall of a cyst of Bartholin's duct. At *a* is shown partly cornified epithelium which is separated by drying from the cyst wall at *b*. At *b* is the cyst wall containing muscle elements and at *c* cellular débris of the cyst.

called the structure the vulvovaginal gland. The International Anatomical Association has since given the gland the name "Glandula vestibula major Bartholini" (1895).

Huguier, in his first work published in 1850, briefly reviews the history of the Bartholin's glands by saying, "this gland has been recognized since the seventeenth century by such anatomists as Plaz-zoni, Duverney, Bartholin, Morgagni, Garengot, Winslow, Haller, Hunter, etc., but has escaped the investigation of modern authors. He credits his friend and colleague, Robert, with a remarkable work on the inflammation of the follicles of the vulva. In this article Robert has marked the situation of two distinct follicles and orifices, but his researches were as unfruitful as those of Haller, neither having determined more than the duct meati." Huguier describes his own work as follows, "it was in 1841 at the time of my installation in the hospital at Lourcine that I discovered again the vulvo-vaginal secretory apparatus. It was at first, as with the ancient anatomists, the ducts which I noticed. A little later, after noticing the great consistency of the vulva in the presentation of disease and the numerous diseases with particular characteristics manifested at the point which the glands occupied, I was directed on the path of the diseases of the gland. The first time I dissected out a gland was on the body of young woman who had died of tuberculosis and who at the entrance into my service had an abscess of the left gland and a purulent hypersecretion of the same organ on the right." Huguier describes the appearance of the gland as corresponding with the description made long ago by Garengot who had said it belonged to the order of conglomerate glands. In 1852 Huguier published in the *Journal des Connaissances Medico-chirurgicales* (Nos. 6 and 8) a new study of the inflammations of the glands of Bartholin.

In 1854 Salmon described a canalicular bartholinitis and in 1860 Aubans denied the existence of inflammation of the Bartholin ducts and glands. In the following year, however, Beaton denied the latter's conclusions and showed that a blennorrhagia might remain localized in the excretory canal of the vulvovaginal gland after having abandoned the vagina and from this source a recurrence might take place. Beaton's work was corroborated in 1865 by Zeissl of Germany. In 1867 the annual report of the second division of hospitals of Copenhagen by Virchow and Hirschen mentions that their diseases of the vulvovaginal glands originate in the excretory ducts, but exhibit disease manifestations nearly always in the glands. Biegel, in his large work, also misunderstands the relation of diseases of the ducts and glands and uses the appellation "Inflammation of Bartholin Gland" without differentiation.

In 1873 Marschal wrote a thesis on abscess of the vulvovaginal

gland and recognized the better findings of previous workers and further showed for the first time the production of rectovulvar fistula. In the same year Gosselin set aside for this affection one of the clinics at Charity Hospital and Diday and Doyon in their "Traite de Therapeutique des Maladies venerieenes" reserved a place of especial importance for bartholinitis and remarked about the influence of menstruation on the recurrence of the symptoms. In this same year Schweizer was the first to describe the metaplasia of the duct epithelium in Bartholin's gland. This was confirmed by

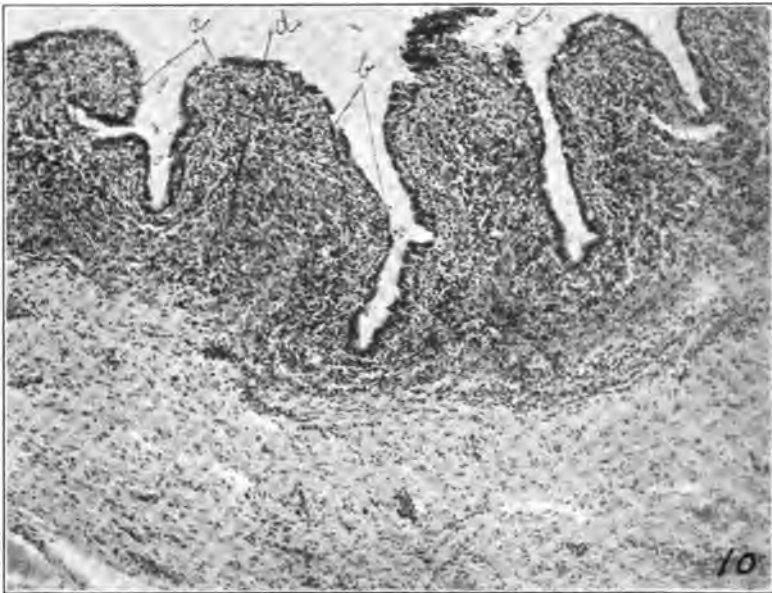


FIG. 10.—(Magnification sixty diameters.) The wall of a cyst of Bartholin's duct. At *a* are areas of epithelial exfoliation. At *b* areas of epithelial metaplasia. At *c* marked desquamation. At *d* and along the entire subepithelial zone there is marked mononuclear infiltration. The picture is typical of gonorrhea.

Sitzenfrey in 1906. A like confirmation was made by Touton and by Noebel.

In 1878, John Morris, of Baltimore, asserted that gonorrhea was a frequent disease in little girls. Pott's article in 1883, and Czeris in 1885, added conclusive proof of gonorrheal vaginitis in children. In 1891 Epstein described three cases of gonorrheal vaginitis in the new-born which he said usually lasted two or three weeks. Cassel in 1893 describes such a discharge persisting from birth until eighteen months of age. Hamilton quotes Holt as saying the nonspecific



cases number less than 5 per cent. In Hamilton's table of 1972 cases of vulvovaginitis, 0.15 per cent. showed Bartholinitis. Pollack reported 1.6 per cent. of her cases of vulvovaginitis in children exhibited Bartholin's abscess. Bartholin's abscess occurred in 20 per cent. of the cases that were pregnant. In 1880 Duncan wrote that vulvitis was a disease of infancy, vaginitis a disease of maturity, and that vulvitis in children generally occurred as a consequence of cold. It being liable to recur and was seen as often among the rich



FIG. 11.—(Magnification sixty diameters.) At *a* is a dilated duct of Bartholin's gland enclosing cellular debris and showing at one place both desquamation and metaplasia of epithelium. At *b* is seen another cystic dilation of one of the ducts with less marked changes of the epithelial cells. At *d* and *c* are shown smaller ducts becoming cystic. At *e* is seen a gland acinus with well-marked cystic dilatation, the cells being of the goblet type.

as in the poor. In 1908 Hamilton, and in 1909 Pollack, further contributed to the knowledge of vulvovaginitis in children. Hamilton says through ancient history and up to the end of the middle ages gonorrhea was apparently recognized in its true character as a specific and communicable disease, but the awakening of medical science during the fifteenth century had the curious result of obscuring rather than enlightening this particular field, and gonorrhea came to be hopelessly confounded with syphilis. Hunter's famous inocu-

lation experiments (using a mixed infection instead of a pure syphilitic virus he produced both gonorrhea and syphilis) befogged the question, and it was not until well on into the nineteenth century when chiefly by Ricord's work the two diseases were differentiated. A second and a third stage in gonorrheal history followed this and was concerned in the controversy over its specificity and infectious character. The problem was cleared when Neisser in July of 1879 described a micrococcus discovered by him in blennorrhagic secretions of the urethra and attributed to this microorganism the preponderant rôle in the etiology of this disease. This may be said to mark the be-

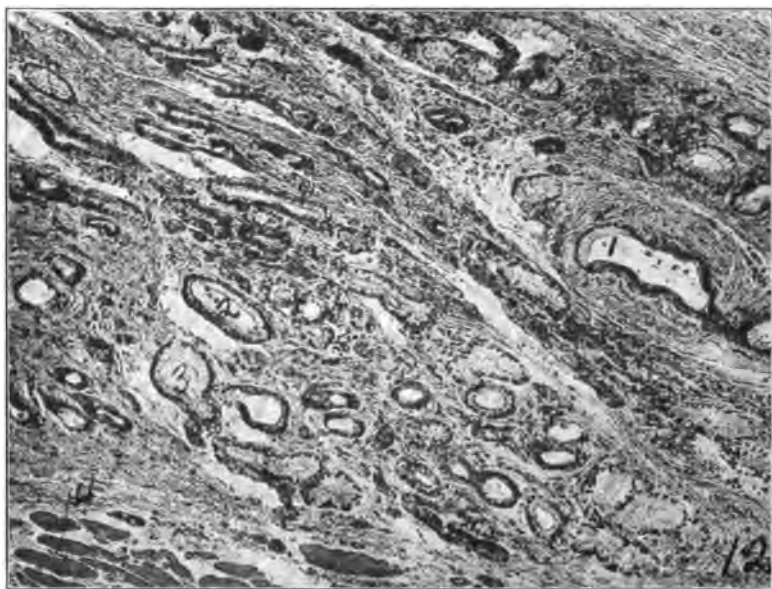


FIG. 12.—(Magnification sixty diameters.) A section of Bartholin's gland showing cystic changes in both ducts and acini. At 1 is the dilated duct. At 2 and 3 dilated acini. At 4 unstripped muscle fibers.

ginning of the bacteriological epoch, for papers before this period had mainly to do with symptoms and treatment.

In 1882 Leistikow first found gonococci in the vulvovaginal diseases, and his discovery was confirmed a year later by Arnig and shortly after this by Weiland, who discovered the gonococcus in the abscess pus of Bartholinitis. In the following year, Martineau and his pupil, Gogul, re-edited the work of Weiland and Arnig. Later researches and controls by Bumm gave additional proof. Bumm and Sanger, about this time, showed that abscess formation

was accompanied by mixed infection. It is interesting to note at this time that in 1885 Langelbert attributed bartholinitis to spontaneity or to excessive coitus. In the same year Scoot reported calculi removed from cysts of the vulvovaginal gland.

In 1886, Fauvel, in his inaugural address on the chronic inflammations and the vulvovaginal fistulæ, contributed a complete work summarizing the knowledge to date and describing specifically the operative technic.

In 1887 and the succeeding twelve years, the literature of bartholinitis was greatly enriched by numerous bacteriological contri-

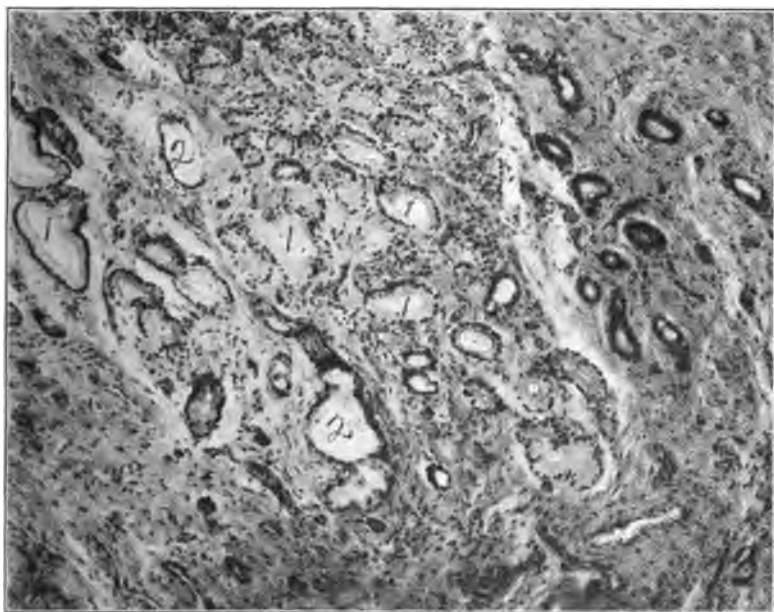


FIG. 13.—(Magnification sixty diameters.) A section of Bartholin's gland. At 1 showing dilated acini with goblet cell formation. At 2 dilated glands with marked epithelial hyperplasia.

butions. Among these may be mentioned the work of Bumm in 1887, Labusquier in 1890, who claimed that the gonococcus was the sole cause of bartholinitis. Veillon in 1893 described a case of bartholinitis due to anaerobes and Menge in Germany, Dujonc in France, ascribed it to other pus-forming organisms as streptococci, staphylococci and colon bacilli. In 1898 Halle in a thesis on the bacteriology of the female canal, showed that anaerobes might exist alone or with gonococci. In 1899 Colombini admitted that nearly all cases of bartholinitis have a gonorrheal origin, but the gonococci are nearly

always associated with other microorganisms as the staphylococci, streptococci and the colon bacilli. He thought it certain, however, that some cases of inflammation of the vulvovaginal gland could not be proven to have an association with gonococci. Mizot and Foster in the same year came to the same conclusions.

In 1888 Chevalerais, cited by Bonnet, distinguished the cysts from the abscesses of the gland, and Sanger described the lesions of the glandular orifice of the canal; and Verchere in 1894 gave many pages of his book "The blennorrhagia in women" to Bartholinitis, and de-

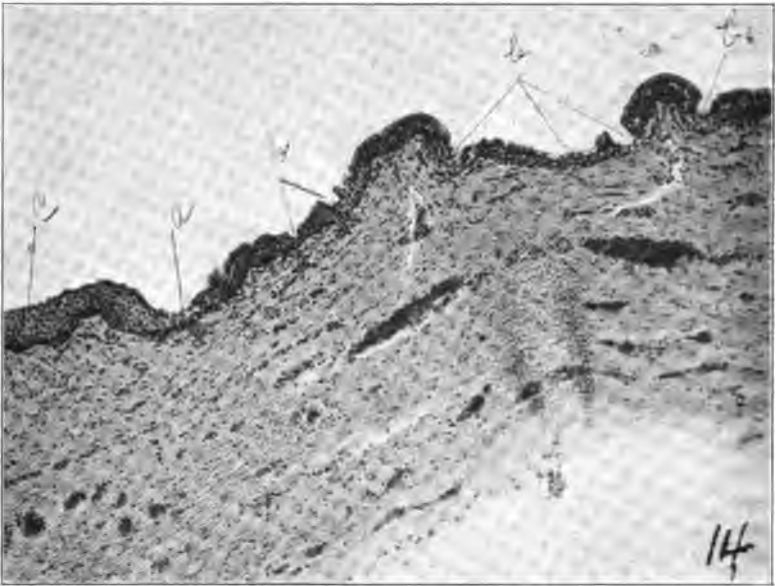


FIG. 14.—(Magnification sixty diameters.) A portion of the wall of Bartholin's duct. At *a* the columnar epithelium is changed to the squamous type. At *b* there is desquamation of epithelium. At *c* is shown the greater depth of stratified epithelium because nearer the duct orifice.

scribed clearly and precisely the ulcerative process which leads to fistula; and Garofalo extolled the treatment of compresses soaked in ichthyol, Cordier the interstitial injection of salicylic acid in saturated alcoholic solution, while Druelle in 1904 preferred cauterization by the thermocautery to the enucleation of the gland. Barendsprung, Fricke, Tiedmann and Huguier all observed that cysts, condylomas, and fibromas at times caused pressure which produced atrophy of the major vestibular glands.

In 1892 Muller gave a resume of the literature of the development

of Bartholin's gland pointing out that they were first recognized in the fetus when it has attained a length of 4.5 cm. They are seen at this time as solid cords passing off from the sinus, urogenitalis. Cullen reports that Pohlman, working in Mall's laboratory, found that the beginning of Bartholin's gland becomes apparent just as soon as the first differentiation of the sex appears externally. It being formerly thought that this was demonstrable about the fourth month, but Pohlman found it in embryos 2 cm. in length. The glands at this time consist of simple pouchings out at the side of the urogenital sinus. This gland was observed to be slower in development than the male gland and its origin is probably ectodermic.

Bergh in 1895 states in his notable contribution upon "Inflammation of the Major Vestibular Glands" that the abstract of the *Handbuch den Frauenkrankheiten*, edited by Hildebrandt, first emphasized that inflammation of the excretory ducts was most often observed, and that the glands themselves were seldom involved. This same view was also taken by Schwarz and by Jadassohn. On the contrary, Wolff and Lang declared the gland played the important rôle.

In 1896 Cumston speaks of the physiology of Bartholin's glands, referring to the secretion of these glands having the function of lubrication during coitus and maintenance of moisture of the parts during the coital act. It also preserves the orifice of the vulva against the irritating action of the genito-urinary secretions. He denies Biuschke's contention that this liquid gives a physiological aid in labor saying the amount secreted would be far too small to be of any decided importance. Atrophy of the glands proceeds gradually with the decline of sexual activity and consequently diseases of these glands become more infrequent after the menopause. This author believed too much of the pathology of Bartholin's glands has been attributed to the gonococcus, but he agrees that this *organism* certainly predisposes tissues to undergo a secondary infection.

In 1904-05 Miller pointed out that occlusion of the duct of the Bartholin gland is subsequent to acute inflammation, and that acute inflammation without the retention of the secretion and pus forms will differ widely from acute inflammation where secretions and inflammatory products are retained within the duct and gland both as to symptom-complex and to subsequent outcome, and in 1905, Cullen observed that the Bartholin duct, after leaving the vagina, gradually increases in diameter in the vicinity of the gland, and then divides into secondary ducts and these in turn divide, forming terminal

ducts which drain the secretion from the lobule. He also observed the formation of very small multiple cysts in the terminal ducts.

Sitzenfrey in 1906 was perhaps the first to report a prolapse of the right side of the vaginal wall following a radical operation for carcinoma of Bartholin's gland. He also described carcinoma developing upon the site of epithelial metaplasia and as a result of previous gonorrheal infection.

Felix reports finding the solid buds of Bartholin's gland developing from the dorsal wall of the pars pelvina of the urogenital sinus, in an embryo of 36 mm. and their first division was observed in one of 80 mm. (head-foot length). The first appearance of the lumen in the efferent duct was observed by Spuler in 1910, in embryos of 82 mm. (vertex-breech length). The first terminal vesicles were observed in one of 120 mm. and the first secretion in embryos from 150-160 mm. (vertex-breech length) and after birth there is a slow increase in the number of the terminal vesicles (Spuler, 1910), and after puberty there is another more rapid growth (Huguier, 1849). At the menopause these glands undergo degeneration and may be entirely wanting in old age (Tiedmann, 1840).

In 1913 Spencer reviewed the literature of carcinoma in Bartholin's glands, tabulating thirteen cases, and reporting one of his own which, with Eden's case reported in the discussion of Spencer's paper, makes in all fifteen cases. In 1915 Wittkopf reported finding but twelve cases of carcinoma of the vulva in the German literature. Wittkopf, writing in 1915, says chronic gonorrheal Bartholinitis may be the etiological factor of carcinoma of Bartholin's gland. Nobl and Borst have supported Sitzenfrey's contention.

*Physiology.*—Huguier says, "there exists on each side of the vulvar openings a conglomerate gland which has a special duct. The structure of this organ has a semblance to that of the lachrymal, salivary and pancreatic glands. Its tissue proper is composed in decreasing succession of lobes, of lobules, of granulations which microscopically are composed of sheaf-like forms, really tubes terminating in culdesacs, of corpuscles, of molecular granules, of a liquid transparent, thick and sometimes containing prismatic crystals. It exists before the sixth month of intrauterine life, develops principally at the age of puberty and atrophies in the old. It offers in its duct numerous anomalies, congenital and acquired which have more than once led astray certain anatomists who, in consideration of some futile researches, have denied their existence. It secretes in a very active manner only at the time of menstruation, during sexual desire, and in the act of copulation which it is supposed to facilitate.

It is closely connected with the clitoris, mucous follicles at the vulvar entrance and the ovaries.

It exists in all the quadrumanes, in the great number of digitigrade felines, the rodents; among the ruminants, in the cow. In the pachydermes it is replaced by mucous follicles.

It is incontestibly analogous to the bulbo-urethral gland of man. *Knowledge of it gives the key to many physiological phenomena which have to do with genital functions, and puts one on the path of a great number of vulvo-vaginal diseases whose cause, course and nature have been hard to appreciate.*

Jadassohn has claimed that the terminal acini of Bartholin's gland have a secretion, exerting a germicidal action.

Morris has said the gland secretion is formed during coition or under lascivious thoughts, more particularly the latter. When the muscles of the perineum and vulva are stimulated to involuntary contraction the secretion is emitted in jets similar to male ejaculations. He cites three cases having involuntary emissions, one of which had as many as eight to ten in twenty-four hours. The orgasms were attended by the ejection of a fluid of a viscid glutinous character, always involuntary, and attended by a feeble, but not unpleasant, excitement.

Cumston says that the Bartholin gland secretion, in addition to rendering coitus easy, maintains the moisture of the parts during the entire act. Besides, it preserves the orifice of the vulva against the irritating action of the genito-urinary secretions. Buischke is quoted as claiming that this liquid is a physiological aid in labor. Cumston believes the amount of fluid secreted far too small an amount for any such function. When a woman's sexual functions are gone, the vulvovaginal glands become atrophied. Their function is lost gradually as sexual activity declines, consequently diseases of these glands are infrequent after the menopause. Neumann's statistics are quoted to show that the glands functionate most actively between the ages of seventeen and twenty-three years, and Huguier is cited as giving the ages of eighteen to twenty-seven years as marking the period of greatest activity. Cumston observes that they are rarely diseased before the age of fifteen and hardly ever after forty-five.

Bergh describes the Bartholin gland secretion as egg white like or gummy and sticky, not dissimilar to the clear secretion of the cervical canal, colorless, hyalin, alkaline or only neutral; it contains only a little mixture of epithelial cells and is not coagulated by acetic acid and contains no mucin. He has observed that the abundance

of the gland secretion seems varied with different individuals and also with changing conditions, perhaps it is greater during menstruation. In sexually excitable women the secretion can be rather copious

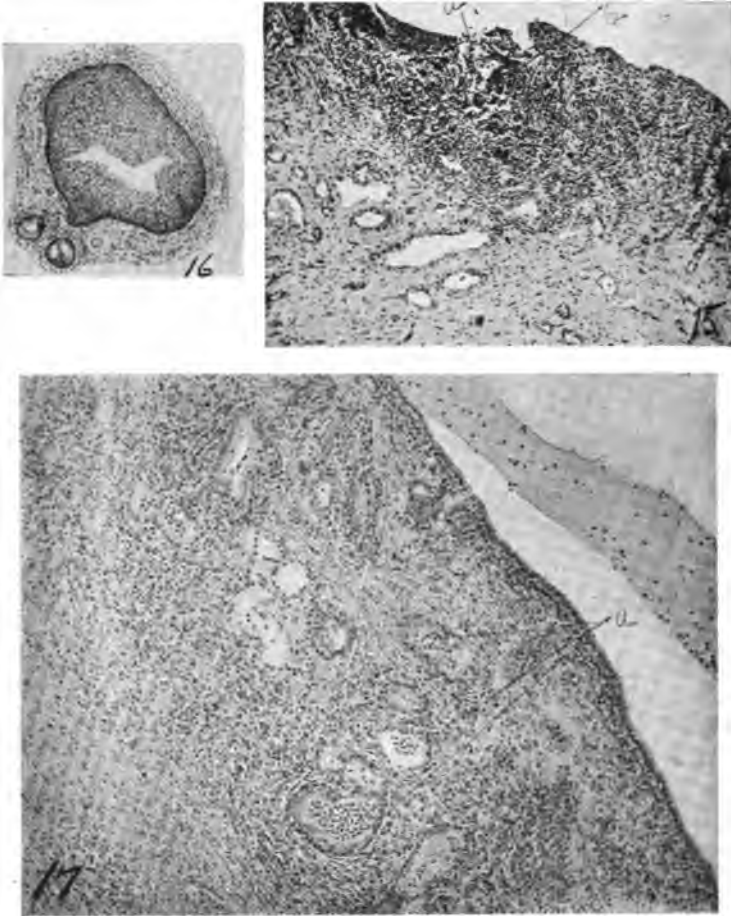


FIG. 15.—(Magnification sixty diameters.) A mixed infection of focal type in the Bartholin duct wall. At *a* the stratified epithelium is gone and at *b* is seen the center of the polymorphonuclear infiltration.

FIG. 16.—Extensive squamous-cell epithelial thickening of the ducts of Bartholin's glands after chronic gonorrheal infection. The section is made through the preglandular portion.

FIG. 17.—(Magnification sixty diameters.) Infection of Bartholin's gland. At *a* within the acini are shown masses of pus cells.

and is often poured forth by just touching the genitals. Sensual kisses, or more evident actions, or even reading erotic lectures by such individuals have been able to cause emission. Bergh suggests that



the mixing of this secretion with the out poured-semen may be necessary. Secretion by the gland apparatus has been shown in the first month after birth.

Langley and Anderson have observed stimulation of the sacral nerves in the vertebral canal, producing sometimes dilation and flushing, sometimes contraction and pallor of the vulva. In the rabbit, dilation and flushing come from the third and fourth sacral nerves, and contraction and pallor from the first and second sacral.

*Gross Anatomy.*—The major vestibular glands (Bartholin) are two in number and are situated in the paravaginal tissue, one on either side of the vagina, to the under and outer part on the side of the vulva in the lowermost part of the labia majora, often noticeable below and external to the posterior vulvar commissure, occasionally seeming to be fastened by a short cord to the ascending ramus of the ischium. They are between the superficial and middle aponeuroses, in the angular space which is formed by the contact of the vagina and rectum. Besides, being covered by the superficial perineal fascia, the outer side is covered by the bulbocavernosus muscle, and its upper end is partly covered by the corpus cavernosus urethræ. Individual bundles of muscles from the bulbus-cavernosus profundus appear also to often pull the posterior or inner side of the gland (Henle). (See Figs. 1 and 2.)

The gland averages in dimensions 10–20 mm. long, 5–10 mm. broad and 5–6 mm. thick, and weighs 4–6 grams. The size varies from that of a pea to a bean or almond.

The glands are in relation above, forward and inward with the bulb of the vagina, below and within nearly in contact with the inferior branches of the hemorrhoidal veins. Outwardly they are limited by the ischium. Behind, they are in relation with the middle aponeurosis of the perineum.

Toward the lower end of the inner side, or to the inner border the gland narrows, giving off the excretory duct which in the depth of the gland gives rise to stem-branches (at most three). The duct courses obliquely, now and then giving a little turn for a distance of 15–20 mm. first in and then outward, seldom horizontally toward the wall of the vestibule, where it empties outside of the middle or lower part of the lateral caruncle or hymen at its outer side about midway between the urethral-papilla and the posterior commissure; more rarely it opens farther back, about opposite the gland itself, and more rarely still it opens above near the urethral papilla. The opening is very small, especially in the not sexually excited females and those who have not borne children. It will admit a horsehair to a small-

sized probe. The orifice is round and is usually surrounded by a very red vascular circle which serves to distinguish it from the surrounding parts.

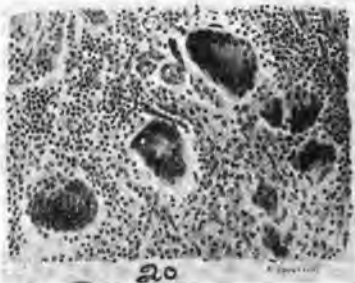
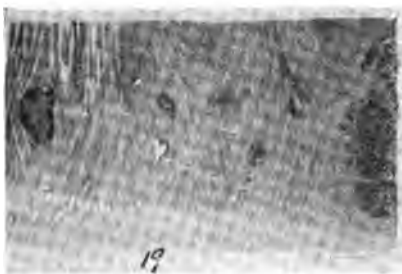


FIG. 18.—(Magnification sixty diameters.) Abscess of Bartholin's gland. The pus and cellular debris is well shown at *a*.

FIG. 19.—(Magnification sixteen diameters.) A section of part of Bartholin's gland. The glandular portion is shown upon the right side of the section. To the left of this is a sclerotic zone with perivascular lymphocytic infiltration. Well over to the left is shown a well-marked tubercular follicle containing giant cells.

FIG. 20.—(Magnification 280 diameters.) An excellent picture of tubercular infection. The lymphocytic infection is well marked throughout the section as are the epithelioid and giant cells.

Huguier, in speaking of the vaginal end of the duct says, "It is necessary to clearly recognize the precise place where the canal empties, for this, as well as the gland, is usually not recognized.

This place is covered by the caruncles or the lower hymen from whence the necessity, in order to perceive, of pushing back this part inward. It does not open perpendicularly to the surface of the vulva but rather obliquely from within and from above. Its external or semicircumference is garnished by a little falciform fold and acts like a valve formed from the mucous membrane. It is not always sufficient in order to see it, to just raise the caruncles or the hymen; it becomes necessary at times to draw down the vulvar mucous membrane downward and outward, to somehow rock or see-saw the surface to see this orifice. The opening of the duct is about  $\frac{1}{2}$  mm. in diameter. If it has been diseased or has passed hypersecretions it may be larger. In almost all women the entrance to the duct is surrounded by a vascular ring which by its red color serves to distinguish this part from its surroundings."

The arterial supply of the gland enters from the inner side as branches from the arteria pudendalis communis and externa.

The veins form a plexus closely woven about the gland and they empty into the external pudendal veins and then into the femoral.

The lymph vessels under normal conditions should empty into the lymph glands around the cervix uteri (Huguier, Martin and Leger), but when pathological changes involve the skin and mucous membrane with the gland and duct, lymph drainage may empty into the inguinal glands.

The nerve supply enters the outside of the gland from the posterior labial nerve (Nervus pudendalis communis).

Huguier and Bergh describe the vulvovaginal gland, nerve supply as coming by the external face of the gland; the arteries penetrate by the internal face and the veins form a plexus about the glands.

*Microscopical Anatomy.*—Cullen likens the entire gland to a bunch of grapes, developed more on the one side than the other. The main duct corresponds to the stem; the secondary and terminal ducts to the branches; and the lobules represent the individual grapes.

The duct near the vagina is lined with many layers of squamous epithelium, passing toward the gland, the duct lining is composed of transitional epithelium, still many layers in thickness. In the deeper layers, the cells are squamous in type, but in the superficial layer—the one directly in contact with the lumen of the duct—they are of the high cylindrical type. Felix quotes Lichtenberg as right in saying the stem of Bartholin's gland is not an efferent duct, but a "glandular stem tubule." The lumen of this stem tubule and primary branches is developed in embryos of 65 mm. The smaller and later branches have the lumen developed at 120 mm. The

secondary ducts have a lining of transitional epithelium like the stem, but the number of layers is usually much less. The terminal ducts may be lined by transitional epithelium, but they are usually found covered by but a single layer of epithelium. Sometimes the cells are high cylindrical in type, at other times cuboidal. The glands forming the lobules are tubular or slightly racemose, are round or oval on cross-section and are lined by one layer of high cylindrical epithelium. The cells, if filled with mucus may be goblet-shaped. The cell nuclei are small, round and somewhat flattened, staining deeply, and are situated at the base of the cell. They bear a very striking resemblance to the cylindrical epithelium of the cervix. Their protoplasm does not, however, take the hematoxylin stain deeply as is so often noted in cervical epithelium. While these small glands which make up the bulk of Bartholin's glands are, for the most part, confined to the lobules, isolated glands are found here and there, opening directly into the main duct or into the secondary ducts. The elements of Bartholin's gland are held together by a definite connective-tissue framework rich in blood-vessels and in nonstriped muscle fibers. This tissue is, according to Müller, amply supplied with nerves.

Jambon and Chaboux examined glands of young adults, twenty-four hours after death and found that the excretory ducts were situated in the middle of the glands in the form of irregular canals reaching even to the middle of the acini. The epithelium cells of the duct were observed to be only half the size of the secretory cells of the acini. There were no striped muscle fibers in the gland itself, but some involuntary muscle fibers were seen around the larger excretory ducts.

Miller quoted Kölliker as saying the excretory duct wall contains a delicate longitudinal layer of smooth muscular fibers and is 2 mm. in thickness.

Colombini describes the vulvovaginal gland as compound with acini sometimes packed tightly together, or they may be strewn apart or scattered so that the gland may be seen through all the connective tissue as scattered granules and lobules. From each sinus a narrow short duct extends outward and empties into an oval widening or canal. From each of these sinuses there arises an excretory duct, these excretory ducts unite with each other to form a common excretory duct which is cylindrical or ampulla-shaped. It is usually single but may sometimes be double. Sitzenfrey says the alveoli and the little beginning canals are clothed with a single-layered low-celled epithelium. (See Figs. 3, 4, 5, 6, 7, 7a.)

*Gross Pathology.*—Anomalies of development may be exhibited in double glands upon both sides or upon one side only of the vagina. There may be but a single gland upon one of either sides. The excretory ducts may be double from a single gland. The position of the gland may vary from a situation near the clitoris to near the posterior commissure. The direction of the excretory duct and position of the meatal opening may exhibit much variation as a result of development, parturition, and disease.

The size of the major vestibular glands must be contingent upon several factors as the general normality of genital development, the degree of function enforced upon the apparatus, and the exigencies of pathological tissue changes. Bergh examined by palpation 1047 healthy women, of this number 450 were under twenty years of age, 169 were not yet eighteen, and only eighty-eight were between thirty and fifty-six years. Eighteen were pregnant and twenty-five appeared unusually sensual. Of these 1047 individuals, 146 appeared to have had diseases of the vulvovaginal gland apparatus, 61 on the right side, 44 on the left side, and 41 on both sides. In 398 of the remaining 901 cases, the glands or their ducts could not be felt plainly. In 440 of the remaining 503 individuals the glands could be plainly palpated, in 238 only on the right, in ten only on the left, and in 192 on both sides. In only 38 were the gland ducts palpable, 25 on the right side, 6 on the left, and 9 on both sides. In 298 prostitutes Bergh was able to palpate the gland ducts in 28 or 9.4 per cent. on the right side, 6 or 2.3 per cent. on the left side, 9 or 3.3 per cent. on both sides. In 137 cases or 46 per cent. the glands were plainly palpable. The glands were found palpable six times more frequently on the right side than on the left.

The literature generally has accorded the left gland a greater frequency of involvement, but the experience of the writer confirms Bergh's statistics. The explanation of a more frequent involvement of the left side has been based upon supposed pressure of the sigmoidal colon upon the return venous supply.

My review of the literature has given no observations of the relative exposure of the two duct meati except as directed to the falciform valve formed from the mucous membrane.

In the larger percentage of my series of cases, it has been observed that there is a considerable variation in development of the nymphæ, the left showing usually a more complete development. The right nymphus has frequently been observed with but the upper third, one-half, or other fractional part completed. The deficiency always being of the lower labial part.



FIGS. 21 to 26.

This causes a greater exposure of the duct meatus, thereby offering easier accessibility to pathogenic bacteria.

The recognition of the gross pathology of the major vestibular gland and duct is, as before mentioned, of very great diagnostic value in clinical determinations of many factors relating to the female genitalia.

Observation of the duct opening should be made after the method elsewhere described. If the meatus is normal, its size will be observed to be very small, approximately  $\frac{1}{100}$  inch in diameter, with a very slight halo of red surrounding it. If the area is purplish red like a flea bite, it may be interpreted as a sign of an inflammation which has subsided but leaves the women a menace to her society (Possi, Miller, Sanger). This has been called by Sanger "the gonorrhoeal macula."

If about the position of the meatus, there is moisture and this is the only area of excessive moisture, it will be significant of some hyperfunction worthy of further investigation. In this relation one should bear in mind the factors of eroticism, onanism, menstruation, trauma and pathogenic infection. If the duct opening is widely dilated, chancres, tumors, hypertrophies, excoriations, scars or any condition tending to draw apart the aperture should have consideration.

The presence of a cyst or abscess of the duct or gland which has discharged recently by way of the duct will cause a widely pouting meatus, but in almost every instance where the meatus is distended

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FIG. 21.—(Magnification 280 diameters). A perivascular nodule taken from the center of a tubercular focus in the Bartholinian gland. In the center of the section are giant cells in the process of formation.

FIG. 22.—A carcinoma occupies the right side of the vaginal entrance. It has a rather wide base and presses the right labium minor forward. The surface presents a cauliflower configuration with tumorous nodules from the size of buck shot to that of a pea, being separated by cracks and fissures more or less deep.

FIG. 23.—A transverse section through a carcinoma of Bartholin's gland. Exteriously the tumor shows the skin covering, next a dense fibrous capsule then a cystic cavity and at the inside, fatty tissue.

FIG. 24.—(Magnification three and one-half diameters.) A section through a carcinoma of Bartholin's gland. At *a* is shown the orifice of the outgoing canal of the gland.

FIG. 25.—(Magnification seven diameters.) A scirrhus carcinoma of the duct of Bartholin's gland. The duct walls show numerous exfoliations of cancer cells with one single cell layer remaining. The ducts are lined with stratified epithelium with the outer layers consisting of flattened epithelium and the remaining layers of cylindrical and spindle types of epithelium. The epithelium in contact with the superficial cells shows marked metaplasia.

FIG. 26.—A squamous-celled carcinoma of Bartholin's gland. Transformation of the stratified cylindrical epithelium of the preëxisting cavities to squamous epithelium with penetration into the surrounding connective tissue. At *a* is shown an area of extension through the membrana propria.

and purplish red in color and is excreting excessively or maintains within or upon the meatal surface a drop of milky secretion, there is a gonorrheal infection. In a few instances, it may be a mixed infection of staphylococcus and streptococcus or of fetides and anaerobes. Bergh calls attention to the value of palpating the lymph glands of the Bartholin glands which lie along side of the uterus on its lowermost part; these he claims can be palpated successfully from the rectum at times by expert gynecologists. It has been usually claimed that the inguinal glands are inflamed in these cases, but Bergh has observed involvement of these glands only thirty-one times in 1984 cases. In the majority of the thirty-one cases there was evident reason for drainage via the skin lymphatics.

Huguier writes of "the orifice of the duct being enlarged or completely lost and is replaced by an opening similar to a culdesac in which the genito-urinary fluids may collect. He also states that the orifice sometimes becomes contracted or completely obliterated thereby causing an abscess, cyst or retention of secretion."

Cysts, abscesses, sclerous changes, neoplastic growths may exhibit deformation that is easily observed or palpated. Differentiation between involvement of the duct and gland is not easy. It should be remembered that cysts and abscesses originate nearly always in the excretory duct and only exceptionally in the gland itself. A tumor, showing early bulging of the labium and later recession toward the ischial border, may be easily defined as an extension to the gland from the duct. It is, however, to be borne in mind that ruptured abscesses may occur into the rectum or into the perineum. In my service at Providence Hospital last year a sclerotic Bartholin gland was excised some two months after an abscess had been incised, and while proceeding with a perineorrhaphy a fistulous tract containing pus was observed that communicated with the gland duct from a point of 2 cm. below the posterior commissure.

In June of last year a case sixty-two years of age was seen in consultation. In this case was exhibited an enormous swelling of the right vulva extending from the posterior to the anterior commissure. The abscess was superficial and of the duct. The tissues had been dissected by the fluid to a point just internal to and above the posterior commissure.

Another case was referred to me last year by a neurologist. The patient was forty-eight years of age and complained of intense pain and distress from a hickory-nut-sized lump in the right vulva at the situation of Bartholin's gland. The tumor was removed and proved to be a cyst of Bartholin's gland with a thick fibrous cover-



ing. The patient was entirely relieved of a most distressing train of nervous symptoms. (See Figs. 11, 12 and 13.)

The hematogenous infections of the major vestibular gland may exhibit no ductal changes unless it is from involvement of contiguous tissue which later extends to the duct. Tuberculosis, though rarely an involvement of the gland, may primarily or secondarily show vulvar ulcerations near the ductal orifice. In two cases reported by Lecene of tuberculosis in the gland the minor lip of one case thickened and there was a little hard nodule in the situation of what seemed to be the border of the Bartholin's gland. Upon histological examination, however, this was found to be a tubercular infection of the gland.

In the second case there was a painful subacute bilateral adenitis, an involvement of the superior internal group of inguinal glands, and an infiltration of the skin giving it a purplish color. The primary infection had entered by way of an anorectal fistula to Bartholin's gland. Upon the labium majus, at the junction of the middle and lower thirds, there was an ulcer the size of a one franc piece. Microscopically this case showed, as did the first case, tubercular infection which in Lecene's opinion was a primary, hematogenous infection of Bartholin's gland. (See Figs. 19, 20 and 21.)

The gross pathological evidence of neoplastic changes in the major vestibular gland and duct is not easily defined, frequently there is associated cyst formation. In perhaps a majority of instances, however, the neoplastic tumor offers a greater density to palpation due to a considerable thickness of encapsulating fibrous tissue (Fabricius). (See Fig. 23.) The growth is invariably slow and subjective recognition is due to the pain and discomfort arising from discrepant tissue densities which in themselves are significant of an advanced growth. (See Figs. 22, 23, 24, 25, 26, 3, 4, 5.)

*Microscopic Pathology.*—The pathological changes of the major vestibular glands may be manifested by:

1. Simple hypersecretion, from estrual periods: coitus and erotogenic stimulation.

2. Inflammation.

Forms: Acute: Acute purulent; abscesses. (See Figs. 15, 17, 18.) Chronic: Cysts (see Figs. 8, 9, 10), scleroses. Chronic purulent: abscesses (see Fig. 18), necroses, hematomata (see Fig. 9), infective granulomata, syphilis and tuberculosis. (See Figs. 19, 20, 21.)

3. Neoplasms. Types carcinomata and (see Figs. 20-26: 3-5), sarcomata.

Huguier has clearly called attention to the effects of prolonged

sexual excitation and vulvar vaginal or uterine diseases in producing congestion, and subsequent hypersecretion. Instead of a transitory effect as it should be there is produced a permanent tissue change, characterized by hypertrophy and hyperplasia which may ultimately involve the entire glandular apparatus. Clinically, there is exhibited in certain cases of this type a marked hypersensibility of the gland. Palpation may be either painful or agreeable and in the latter case ejaculation of mucus follows even slight manipulation of the gland. The histopathologic changes of the glandular apparatus following inflammation may be described with the greatest facility and directness under three captions according to their anatomical localizations as canalicular, glandular and periglandular.

The duct epithelium may exhibit hypertrophy, along the entire lumen, or may be entirely gone in many places, leaving the duct surrounded only by connective tissue. Here the areas made bare may show mononuclear and polynuclear infiltration. At the places where the hypertrophic changes are most marked, occlusion may take place, giving rise to cyst formation. The most important change in the epithelium is a transformation of the columnar to stratified pavement epithelium, due undoubtedly in the vast majority of instances to the effects of gonococcal infection. This metaplasia will be most marked at the summits and depths of the crypts. (See Figs. 3, 4, 5, 13, 14.)

The duct orifice may be wholly obliterated or may be seen widely gaping. In early acute inflammations the infiltration about the duct is made up mainly of in wandering leukocytes and plasma cells (Unna). In the lumen of the duct there is pus, free epithelium and gonococci, staphylococci, streptococci, or other bacteria. With this condition the gland easily becomes involved. Where there is occlusion of the duct toward its orifice, and an accompanying infection, there is also the accumulation of duct and gland secretion and early cyst formation resulting. The epithelium is reduced to a single layer of cells which may or may not retain preservation for any length of time. (See Fig. 16.)

In abscess formation there is perhaps always a mixed infection which in the vast majority of cultural tests reveals the presence of the gonococcus. The abscess wall shows polynuclear infiltration extending to varying distances into the contiguous tissues. Rupture of the duct lumen with hemorrhage and extension of the abscess to the vagina, rectum or perineum may occur. The point of occlusion in the duct may open and a fistulous tract is established to the vagina. Extension to the gland of the abscess contents

is easy when one considers the plan of the gland canalization. The conglomerate gland structure facilitates multiple abscess extension or formation. Involvement of the gland acini has been seldom observed. It is to be expected that inflammation of the glandular apparatus in girls under the age of puberty is an involvement of the glandular stem because of the gland's immaturity. The pathology of this condition in children has not been adequately studied. It is indeed a significant field for investigation as Pollock found Bartholin abscesses in 1.6 per cent. of a series of 189 children. In fifty cases of gonorrhea in girls under ten years at Fisher Hospital, Hamilton reports 2 per cent. of bartholinitis; and in fifty cases of gonorrhea of children from two months to fourteen years at Buschke Hospital, Berlin, one case of bartholinitis.

In eighty-two cases of children at Memorial Hospital for Infectious Diseases, Chicago, ranging in ages from thirteen months to thirteen years (75 per cent. being under seven years), there was one abscess of Bartholin. In Hamilton's table of 1972 cases there were three cases. Whether or not one doubts the curability of gonococcus infections, their latency must be admitted. (See Figs. 10-14: 16-18.)

Will the period of sexual function in these cases give opportunity for a gonorrheal "rechute"?

Neoplastic changes in the gland apparatus are not frequently seen. The literature of December, 1913 gives, according to Spencer, a record of but fifteen cases of carcinoma, and I can give no record of primary sarcoma.

Pathological studies of carcinoma of Bartholin's gland (Wittkopp Spencer Schweizer, Fresch, Fabricius, Frank, Schaeffers) give evidence of the cancer cells originating in the squamous epithelium after metaplasias, following old chronic gonorrheal infections. In all cases studied their was no remaining normal gland tissue. (See Figs. 3-5: 22-26.)

1229 D. WHITNEY BUILDING.

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## HEAT AS A METHOD OF TREATMENT IN SOME FORMS OF CAVITY CARCINOMA.\*

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(With one illustration.)

WE will first consider the treatment of cancer of the uterus by the application of a Pasteurizing degree of heat applied while the patient is under an anesthetic; and second, refer to the possible beneficial results to be obtained by the continuous application of an enduring or supportable degree of temperature in inoperable cavity carcinoma without a general or local anesthetic.

From the historical viewpoint there are many indications that fire played a most important part in the surgery of primitive man. The records of the past, it is true, are rather shadowy in this as in other important matters of human effort for the relief of diseased processes; but that fire was used to cut down, or remove, offensive external growths, to limit the hemorrhage and do away with the offensive discharge, in addition to cutting off diseased extremities, admits of no contradiction(1).

Following the irregular and empirical use of the cautery, came the epoch-making work of John Byrne, of Brooklyn, N. Y. He advocated the excision of the cancerous cervix by the use of the galvanocautery knife(2). This cutting operation by heat, it is unnecessary to relate, required a high degree of temperature in the electric knife. It can be stated further, and accurately, that the Byrne operation was limited to the first stage of cervical cancer involvement, the type of case that is to-day considered suitable for the Reis-Wertheim radical hysterectomy. Byrne did not attempt

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his technic in the advanced inoperable pelvic cancer patient; the one in which the examining finger, through the vagina, gets the impression that the pelvic basin is filled with cement. Byrne began his galvanocautery excision of the cervix approximately forty-four years ago. His published results have always interested surgeons, and many of them, in a desultory way, have attempted his technic; but none have had either his experience or his successes to record. But out of these unsystematic or irregular attempts to follow the work of the Brooklyn surgeon, especially in the last thirty years, occasional reports would be made of the disappearance of advanced cervical cancer where the cautery had merely been employed to melt down the prolific mass in order to stop the hemorrhage and the repulsive waste.

It is also of tremendous interest to learn that for some reason, possibly unfathomable, the cancer-invaded tissues of this type would heal over, and remain so, and the patient recover. A notable outcome in a case of this character is to be found recorded in one of my first papers<sup>(3)</sup> where I reported the results in my first series of cases, thirteen in number. This patient was operated September 21, 1908, and as far as freedom from pelvic or any other ascertainable form of carcinoma is concerned, is to-day in perfect health<sup>(4)</sup>. This woman's abdomen, however, was not opened, and there was no subsequent treatment.

It was the results in this very extensive and otherwise hopeless type of case that taught me the possibility of a cure from the application of a cauterizing temperature. It may be well to report here also that the great extent of the involvement of the apex of this woman's vagina, with the final favorable results, encouraged me to persist in trying to find a method for the more thorough application of a cauterizing temperature in my future cases, almost regardless of the possible destructive effects on the adjacent normal tissue structures. If the posterior bladder wall, exclusive of the ureteral orifices, or a portion of the anterior wall of the rectum, are involved in the malignant invasion, it is better that these be destroyed with the hope of a future surgical repair, than to leave them uninfluenced by the heat. A colostomy can be made a good substitute for the normal anus, and the upper part of the vagina can be converted into the lower part of the bladder. The tragedy not infrequent in metastatic cancer of the bladder and rectum is an ascending pyelonephritis. This complication exists either alone or combined in a very large percentage of cases when these patients first present themselves. It is not an uncommon finding for the



cystoscope to disclose deformed or infected ureteral openings. This condition cannot be improved by the application of the heat. Indeed, if the carcinoma involves the region immediately adjacent to the ureters, and this area is destroyed by the heat, the problem of repair involves the further danger of deforming the ureteral mouths, or of kinking the ureteral tube when the edges of the fistulous opening are sutured together. It was the recognition of this very real difficulty that suggested the technic referred to above, that of converting the upper part of the vagina into the lower part of the bladder. A vesicovaginal or a rectovaginal fistula, whether produced by the cancer or by the heating iron, adds greatly to the ease with which the ureters, pelvis of the kidney, or the kidney proper, may be infected. In my early work, my greatest concern was a postoperative hemorrhage from the uterine arteries. With the tying of the internal iliacs and both ovarians, this has been eliminated as a source of worry. But a larger experience has developed the fact that a terminal kidney infection, either a nephritis or a pyonephrosis, is a complication that has added to my mortality statistics in a way that cannot be ignored.

I am also convinced that an early prolific cause of these damaged kidneys is a pyometra which so frequently accompanies cervical cancer. The growth blocks the canal, infection of the retained secretions increases, the uterine cavity fills with septic material, and absorption occurs with its varied train of symptoms, viz., cachexia, loss of weight, and general deterioration of health. The patient dies, not from her cancer, but from a general sepsis produced by the mechanical obstruction incident to her malignantly closed cervix. When the heating iron is passed to the fundus of the uterus and the cavity thoroughly sterilized, and natural drainage thus provided for, it is one of the most gratifying experiences in surgery to see these women improve in every way. As a rule, the cachexia disappears within two weeks. If the bladder and rectum have not been opened, the improvement, both local and general, in the great majority of these women, is in every way comparable to the case of benign obstruction of the stomach after a well-made gastroenterostomy.

Occasionally surgeons, in discussing the relative merits of the various recognized surgical procedures for the treatment of cancer of the uterus, refer to degrees of malignancy as they are found in the cervix and body of this organ. The inference is almost always drawn that cancer of the body of the uterus and that of the vaginal portion of the cervix, which does not involve the canal, are much

less malignant than the form which has its origin within the cervical canal. From the standpoint of pathology, this is true. In another paper(5) I have referred to the practical classification which may be made when these cases are first examined. On the cervix we may have the "vegetative" or "everting" form of growth in contradistinction to the "infiltrating" or "inverting" form of the disease. This latter is the squamous-cell type of carcinoma of the cervix, which occasionally involves not only the vaginal portion of the cervix, but the general vaginal walls as well. When this occurs, there is not much ocular evidence of its presence, but, digitally, small pearl-like masses can be felt, which develop not only from the surface structures of the vagina, but also from its deeper tissues. It is this infiltrating form that is exceedingly vicious in its tendency to recur, when once its host is disturbed and laid bare by the knife of the surgeon. It is a curious and also an interesting fact that adenocarcinoma of the body of the uterus seems to be a much less virulent disease than the same disease when at work in the cervical canal. It is also a much more difficult matter to arrest the progress of carcinoma when its greatest activity seems to be at the junction of the body of the uterus with the cervix—the probable explanation, from the anatomical point of view, being the abundance of lymphatics and blood-vessels at the cervical neck in comparison with the meager supply in the body of the uterus. Uterocervical carcinoma, if it originates in the cervical canal, is difficult to arrest, and when disturbed by the knife of the surgeon also often assumes a rapidity of growth that is remarkable.

But it is not necessary to particularize or specify degrees of malignancy in various forms of cancer when subjected to the usual well-known surgical procedures where the knife is used. What should be emphasized is that no matter where the cancer is located—in the uterine fundus, the cervical canal, or the everting type on the surface of the cervix—if given time enough, all forms of the disease will kill the patient. It is begging the question, as one writer has done recently, to state that 75 per cent. of the "fungating" or "everting" type of cervical cancer can be successfully removed by hysterectomy, and without recurrence. You cannot remove any type of pelvic cancer with the cold steel knife, without an enormous margin of risk of a return of the disease. The steel knife always acts as a mechanical stimulant when it touches a malignant cell-nest, no matter how small or how remote it may be from the original focus. To attempt, therefore, a differentiation of the degrees of malignancy, as far as our clinical knowledge of cancer, to-day, is

concerned, is useless. Time, alone, is the insistent factor that makes every potentially malignant cell arrive at the same deadly goal.

There is another phase of the pelvic cancer question that I do not believe is sufficiently recognized by surgeons; and that is the slowness with which metastasis appears outside the pelvis in other regions of the body, especially the abdomen. We know that rectal carcinoma in the larger number of cases causes no special discomfort as long as the intestinal tube remains unobstructed, often for years. The pelvic basin will literally hold carcinoma, many times, until the whole cavity is tightly packed with the disease; and, at postmortem, a thorough search will discover no malignancy other than in the pelvis. These cases unoperated, or, if operated with the knife, die, regardless of the type of cell disclosed. But if the mass can be heated to a degree which experience, and the laboratory, have shown inhibits the further growth of the disease, an otherwise utterly hopeless case can be brought back into the realm of operability with the prospect of a life prolonged in comfort; or, frequently, a life saved for an indefinite period.

In a discussion on cancer metastasis before the American Surgical Association, the late Dr. John B. Murphy(6) referred to the findings in 10,315 postmortems made in cancer cases that had died of the disease, located in various parts of the body, without operation. He stated that in cancer of the cervix and uterus no demonstrable metastasis in the glands outside of the pelvis had been found in 30 per cent. of the cases. In other words, a woman can die, unoperated, of cancer of the cervix or uterus, and a scientific postmortem will disclose no extension of the disease beyond the original focus. Is it at all strange that Murphy should observe, as he did in that discussion: "Then we may well ask: How many cases can be saved by an operation, if it be performed months or even years before the dead-house stage of the disease is reached!"

I believe that we are near the time when we must ask ourselves whether we have not been too pessimistic with regard to the possibility of benefiting cancer by treatment. Our attitude is one of chronic doubt. This is a most unfortunate basis for constructive scientific endeavor in the development of any hopeful form of treatment, whether it be cancer or some other disease. Again, we too frequently give up after the first attempts to obtain benefit seem about to fail. The patient is abandoned to her fate, encouraged to take morphine, which means death due to cancer and morphine. Our pessimism is well reflected by the attitude of the public, who consider the whole question as well settled, and that, too, on the side

of utter hopelessness. The treatment of cancer requires an infinite amount of patience in its management, careful judgment and wide experience. In addition the patient, not to mention the surgeon, must be willing to stand a lot of grilling disappointment and grief in an advanced case.

So far, we have been considering the application of heat in cancer, only when the patient is under an anesthetic. General anesthesia, and its effects on the developing body resistance to the progress of the cancer mass assumes additional importance because of the recent findings of Gaylord(7) of Buffalo. This work seems to show that in the experimental cancer of the laboratory animal there is a distinct lowering of the natural resistance to the growth of cancer after the administration of either ether or chloroform. These studies also seem to demonstrate that the nitrous oxide, oxygen method of anesthesia does not interfere with the animal's resistance to the inroads of cancer to the same extent that ether or chloroform do. The question of the treatment of cancer by heat, without the patient being under an anesthetic, gains additional importance again from the studies of both Wassermann and Delbet. Wassermann determined that a mouse, the subject of experimental cancer, if placed in a continuous external temperature of  $40.5^{\circ}\text{C}$ . ( $115^{\circ}\text{F}$ .) will show not only an inhibition of its carcinoma growth, but the cancer will gradually disappear. The control animal, on the other hand, will die from the progressive development of the disease. Delbet repeated these observations of Wassermann's, and confirmed them in every particular.

In my studies of the relative value of high or low degrees of heat in the permanent destruction of a mass of cancer, it did not take long to recognize the fact that a gross mass of cancer could be totally destroyed by the actual cautery; but the important fact remained that the attenuated malignancy outside of the immediate mass was practically not influenced beyond the point of contact with the cautery. The explanation of this is the development of the carbon core from the excessive production of heat in the cautery iron. On the other hand, when a Pasteurizing degree of heat was applied over a period of from forty to sixty minutes, a destruction of the pathological tissue a very considerable distance beyond the direct application of the heat was obtained. The length of time required to obtain the most extensive penetration possible by the low heat in the heating iron is explained by the inhibiting effects of the circulating blood. You cannot get heat penetration in the most effective way until the flow of blood in the parts is arrested. Since the tying

the internal iliac arteries and both ovarians the time necessary to get the required degree of heat penetration, has been materially shortened.

My experience in the treatment of cancer comprises, first, the cutting or cauterizing temperature. The logical result of this use of the cautery, in cancer of the uterus, was the production of the carbon core with a consequent inhibition of further heat penetration. This use of the cautery taught me that heat was the essential thing. From this grew the experimental(8) work from which I determined the necessary degree of heat by a controllable electric heating iron that would give the greater penetration. The direct effect of this degree of heat was determined to be a coagulation of the tissues without the formation of the carbon core. This discovery has been of immense practical value in treating mass-cancer by the dissemination of heat. Both in my clinic, and in the clinics of other surgeons, this later method added greatly not only to the immediate results but in lessening many disagreeable sequela for the patient, so that the remote results, so far, are such as to lead me to believe that we are in a position to offer patients something that is more than a hope.

The one remaining problem has been that of treating the infiltrating form of the disease where it involved the vagina, and possibly the bladder or rectum. In these locations, mass or bulk as it exists in the uterus, is frequently not present; and the cautery is out of the question, because of its destructive effects. Coagulation, on the other hand, cannot be obtained with a low degree of heat, because there is no mass through which it can be disseminated. The next problem, then, was to inquire whether it was possible to adapt to the human sufferer from this disease the methods which had been successfully used to destroy the malignant growths of the laboratory animal by the continuous application of a very low degree of heat. Cancer in the vagina, about the vulva, in the anus, and frequently in the rectum and bladder is, as already mentioned, of the infiltrating type; *i.e.*, it is without bulk, thin, and frequently spreads over a considerable area. It was necessary to devise a special instrument that was practicable for this treatment. I first tried a small electric lamp pushed into the finger of a rubber glove, and inserted it into the vagina. I found that the electric light could not be adapted to this sort of work, because it soon burned out. In addition to this, there was no means of knowing the degree of temperature that one was getting in the cavity treated.

Without detailing further the various attempts made to find a

satisfactory instrument, I will describe the one finally adopted as the most useful. It consists of a series current-tap, marked *A* (see Fig.). This can be inserted into any electric lamp socket of 110 volts, on either a direct or alternating current. A carbon lamp *B*, of half ampere with a deep blue glass globe, is part of the outfit. The degree of heat is regulated in the heating iron by a small set screw *C*. The degree of temperature, while the instrument is in use is shown by the thermometer *D*. The heat is maintained automatically in the heating iron *E* at the required temperature, through the series current-tap.

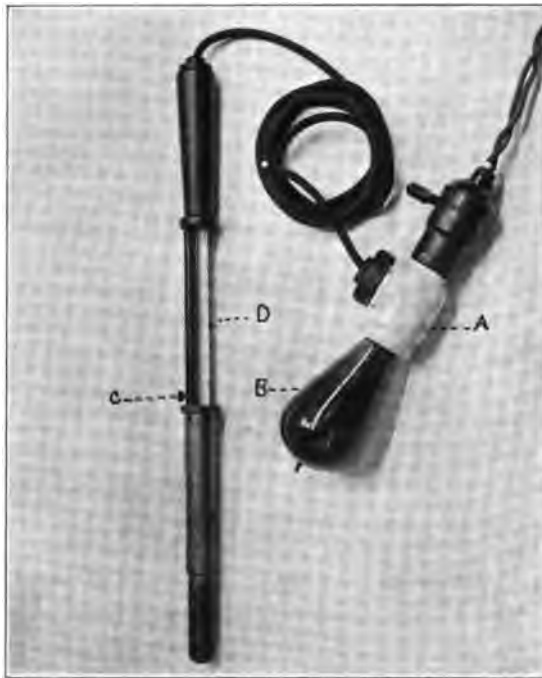


FIG. 1.—Cautery with thermometer

I have stated elsewhere that "A mass of cancer is destroyed when the temperature is raised to  $40.5^{\circ}\text{C}$  ( $115^{\circ}\text{F}$ .) and maintained for ten minutes." This requires a degree of temperature, however, in the electric heating iron that is beyond the point of toleration, hence the necessity for an anesthetic. Without an anesthetic the vagina gradually establishes a toleration for heat from  $49^{\circ}\text{C}$ . to  $60^{\circ}\text{C}$ . ( $120^{\circ}\text{F}$ . to  $140^{\circ}\text{F}$ .). In some cases this toleration reaches  $71^{\circ}\text{C}$ . ( $160^{\circ}\text{F}$ .) but only after several weeks of contact with the heat.

My first case of vaginal carcinoma, treated with the continuous application of heat, was Mrs. H., aged fifty-nine, who was referred to me by Dr. J. C. Tritch, of Findley, Ohio. This woman was an utterly hopeless case when she first presented herself for examination, July 24, 1915. Her pelvis and vagina were studded with carcinoma. She was cachectic, suffered pain, had hemorrhages, and was plagued with the usual foul discharge. July 27, 1915, I opened her abdomen, and tied both internal iliac ovarian arteries. The uterus was the size of an ordinary grape-fruit, and its serous surface covered with malignant nodules. The heating iron was passed to the fundus of the uterus and the heat in the shank of the instrument was allowed to play on the vaginal mucosa with the hope of destroying the infiltrating form of the disease which existed there. This woman made a good operative recovery, and returned to Ohio to visit friends. I did not see her again until December 30, 1915. At this visit she was free from cachexia and looked good. But her vagina was full of carcinoma down to, and involving, the vulva. In addition, she had a vesicovaginal and a rectovaginal fistula. The urine and the feces came through the vulva. She was told that I would open her abdomen again, and, if there were no abdominal metastases, I would treat the vaginal carcinoma.

The abdomen was opened for the second time, December 31, 1915. Absolutely nothing was found indicative of cancer in the pelvis. The uterus was small and free; there was nothing to indicate cancer on its serous surface. The upper abdomen was also without evidence of metastasis. The abdomen free of cancer, I felt warranted in attempting to treat the extensive carcinoma of the vagina by the continuous application of as high a degree of heat as the patient was able to bear without local or general anesthesia. It was necessary to use some force to introduce the heating iron through the vaginal mass. The heat was maintained at a temperature varying from 48.5° C. to 60° C. (120° F. to 140° F.) and used continuously, night and day, except when necessary to empty the vagina of fecal matter, or to allow the patient a little exercise.

The result of the continuous application of the heat in this patient was the gradual disappearance of the mass in the vagina. At the end of six weeks it was possible to insert the largest bivalve duck-bill vaginal speculum. There was no longer any microscopic evidence of cancer. The anterior wall of the vagina was gone; the rectal mucosa protruded through the posterior vaginal wall, as is common in a left inguinal colostomy. Both openings, were perfectly clean and healthy. Digitally, no palpable mass of cancer could be felt. The carcinoma had been completely destroyed by the heat. The patient, however, was not improving physically. It was evident that she was failing. Palpation of the kidneys developed the fact that they were both enlarged and painful. In other words, she was suffering from a double pyonephrosis. She returned to her friends in Ohio and died two weeks later. A postmortem was not obtained.

This case does not record a success; but it records a most impressive fact; and that is, that the continuous application of a low degree of

heat converted a vaginal tube, packed with cancer, into one that would admit a large duck-bill vaginal speculum after the heat had been applied, more or less continuously, for six weeks. It should be noted that the ureters, in this patient, were of the golf-ball variety, and that they could be catheterized without difficulty through the vaginal speculum.

My second case was Mrs. M., aged sixty-three, American, housewife. Four years ago she was subjected to a panhysterectomy. As far as could be determined from her history, the operation was done for a suspected beginning malignancy. She did well, physically, until a year ago. At that time she developed frequency of urination, with accompanying bladder discomfort. There was an offensive, bloody, vaginal discharge. Examination showed there was no cervix; the vagina vault was thick, immovable, and ulcerating. Through the cystoscope the anterior and posterior walls were pushed together for a third of the distance. She had consulted a number of surgeons. All told her that the condition was inoperable. This patient was put to bed and subjected to the continuous application of heat as described in the previous case. The results were not brilliant, but suggestive. All of the subjective symptoms, of which she complained when she first presented herself, gradually disappeared. At the end of four weeks she believed herself cured. But I did not encourage further treatment because I could not promise further improvement. This was six months ago. This patient reports that she has had no return of the distressing symptoms for which the heat was employed.

This case illustrates well the point already referred to, viz., that the circulation of the blood protects a cancer-mass when it is firm; this was true in this case. Again, the heating iron could not be made to penetrate the center of the mass as in the first case where the cancer-mass was not so firm and more of the "everting" type. The second case belonged to the latter variety.

It is probable that in cavity-carcinoma, vagina, rectum and bladder, where the walls are thin and the carcinoma of the infiltrating type, *i.e.*, well spread out, that the method just described will be found more effective and less destructive to the normal tissue cells than the coagulating degrees of temperature necessary when the abnormal growth is extensive.

In closing, permit me to assure you that I possess no delusions. Neither am I entertaining any illusions regarding the possibility of the work just described. The continuous application of heat is of more than academic interest. My pleasure this evening is in bringing to you the report of one case where, after using a coagulating degree of temperature, the patient remained free from her pelvic carcinoma for one year, dying, finally, from a double surgical kidney.



But before she died her extensive vaginal carcinoma also disappeared, under the use of the continuous application of a low degree of heat, in a way to give us hope, at least, that the type of cavity-carcinoma under discussion will become more amenable to the heat treatment when its possibilities are fully developed and understood.

Gentlemen, heat, not fire, will destroy cancer. It merely remains for you and me to work out the great problem of its most efficient application.

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### THE SURGICAL TREATMENT OF UTERINE CANCER.\*

BY

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THE value of the various forms of treatment of uterine cancer can only be determined when certain fundamental characteristics of this disease are kept in mind. These characteristics relate to the differences in malignancy observed in the three forms of cancer affecting the uterus; to the distribution of metastasis; and what is of greatest importance, the lessons learned in our clinical experience in the treatment of cancer of this organ.

The three types of cancer found in the uterus are the adenocarcinoma of the fundus, the cylindrical-celled carcinoma of the cervical canal, and the squamous-celled carcinoma of the portio vaginalis.

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In the later stages of the disease it is often difficult to clinically differentiate these types, yet in most cases this can be done.

The least malignant of uterine cancers is the adenocarcinoma of the fundus. This peculiarity can be explained only on anatomical grounds. The thick uterine wall keeps the growth circumscribed and localized for a long period of time before metastasis can take place. In this position the disease must penetrate the thick, firm uterus before involvement of the cellular and lymphatic tissues of the broad ligaments takes place. Occasionally the metastasis in fundus carcinoma takes place by a downward extension into the cervical portion and then outward into the pelvis.

The most malignant form of uterine cancer is the cylindrical-celled carcinoma of the cervical canal. Here the growth is located in the thinnest part of the organ and immediately contiguous to the cellular spaces at the base of the broad ligaments, rich in blood-vessels and lymphatics. There is also no protective layer of peritoneum. In this manner the early appearance of the disease in the pelvis must be explained.

Another relatively benign form of uterine cancer is the squamous-celled carcinoma of the vaginal portion of the cervix. Here the growth remains localized for a time, and extension takes place only after the cervix is greatly infiltrated and the cervical canal involved. Owing to this retarded mode of metastasis cases of carcinoma of the vaginal portion are observed which after cautery operations remain free from recurrence for long periods of time, sometimes for years. Such periods of latency are never observed in cancer of the cervical canal.

Another characteristic of uterine cancer is that after extension has taken place into the pelvic cavity, the disease has a tendency to remain localized before other parts of the abdominal cavity are invaded. This tendency to remain localized and the variations in the degree of malignancy has given rise to the belief that the disease can be cured by other means than complete radical extirpation.

In the literature on uterine cancer the results from treatment are usually reported as a whole, no distinction being made as to type. Only occasionally do we find that the fundus carcinomas are given separately, and in a few instances the portio and cervical canal carcinomas are also listed separately. When no such distinction is made and the results from the different methods of treatment are at variance, they always appear more favorable.

From the foregoing, it seems reasonable to infer that cancer of the fundus operated early should be curable by almost any form of

hysterectomy. In actual practice this has been shown to be the case. The cures in this form of cancer are estimated as high as 75 per cent. Theoretically, early portio cancers should also be cured by complete hysterectomy, in which is included the upper part of the vagina. To secure good results in the deadly carcinoma of the cervical canal, it should not only be operated very early, but a most complete and radical operation, such as the Wertheim, is imperative. As a general rule, it is more scientific to perform the radical operation in all operable cases.

The most important problem in the whole subject of uterine cancer is that of early diagnosis, for were the disease always recognized in an early stage, there could be no argument regarding a method of surgical treatment. It is a lamentable fact that in actual practice the vast majority of the patients present themselves for treatment when it is too late.

It has been estimated that in this country only about 10 per cent. of all cases are operable. Much can be accomplished in the prophylaxis of this disease in repairing old lacerations and lesions of the cervix. As a prophylactic measure, amputation of the cervix is preferable to trachelorrhaphy. The danger of both cancer of the vaginal portion and of the cervical canal, the two most malignant forms, is thus permanently removed.

The most important surgical measures to be considered at the present time in the treatment of uterine cancer are:

1. The radical abdominal operation of Wertheim.
2. The extended vaginal operation of Schauta.
3. Percy's operation for inoperable cancer.
4. Radiotherapy with radium or x-ray.
5. Surgical operations combined with radiotherapy.

In a paper recently read at Detroit before the Gynecological section of the American Medical Association, 1916, the author attempted a compilation of the results obtained from each of the above methods of treatment.

Where the type of cancer was stated as being of the cervix, the radical abdominal operation of Wertheim employed by ten surgeons, in 566 operations gave a primary mortality of 131, or 23.11 per cent.; and the permanent cures after five years, 144 or 25.44 per cent. The average operability was 35.1 per cent. Wertheim's own figures for his operation are 714 operations with a primary mortality of 119, or 16.6 per cent., and permanent cures after five years of 186, or 42.5 per cent. His operability was 50 per cent. and absolute cures, based upon the number of patients observed, is 20 per cent.

The radical abdominal operation of Wertheim used by eight other surgeons for cancer of the uterus, where the type of cancer was not stated, gave for 498 operations a primary mortality of 101, or 20.3 per cent., and permanent cures after five years, of 87, or 17.47 per cent. Their average operability was 53.6 per cent.

Combining the results of the radical operations obtained by nineteen surgeons, we get out of 1778 operations a primary mortality of 351, or 19.68 per cent., and permanent cures after five years, of 417, or 23.46 per cent. The average operability of all combined is 46.2 per cent. With this operation approximately one out of every four women operated for uterine cancer, pass the five-year limit without recurrence.

The extended vaginal operation of Schauta has its special advantages and gives in the hands of those experienced with it, results which compare favorably with the radical abdominal operation of Wertheim. This operation has not been employed extensively in this country. It is especially advantageous in obese women where the radical abdominal method is always difficult. Thaler, recently reporting the results from the Schauta clinic in Vienna up to the year 1915, gives the following data; 654 operations were performed on 1305 patients; the permanent cures after five years were 133, or 17.4 per cent.; the absolute cures calculated from the number of patients observed was 10 per cent. The average operability as given by Schauta is 58.1 per cent.

Regarding the operation of Percy now so widely employed in the treatment of inoperable forms of cancer, the method is of great value in this class of patients. Percy has given us a new principle in the treatment of cancer. With no other method can the fixed pelvic structures be so loosened and mobilized. The tissues following the application of a low degree of heat are coagulated and dissolved. The method has an operability of 90 per cent., but so far nothing can be said of the primary mortality, the permanent cures, or the absolute cures. The primary mortality is estimated at 50 per cent., the permanent cures after five years cannot be spoken of at this time, as no one has thus far published a sufficiently large series of cases to form any accurate estimate of the actual curability of this procedure. It is highly probable that were the method used in earlier cases of cancer of the uterus, the results would be more favorable. The Percy operation, when properly performed, is the best means at our command for the treatment of inoperable or borderline cases of cancer of the uterus. We await with great expectations the publication by Percy of his end results.

In the  $x$ -ray and radium we have come to recognize another powerful agency in the treatment of uterine cancer. The recent improvements which have been made along these lines promise to overshadow former results in radiotherapy. It seems that the destruction of cancer cells by röntgen therapy does take place. This has been proved histologically. Case estimates from a review of the literature that in about 25 per cent. of the cases of uterine cancer, the temporary effect of the röntgen treatment has been satisfactory.

From a careful review of this subject, it must be at once apparent that up to the present time our best results are obtained from surgical measures, more particularly the radical abdominal operation. Radiotherapy, heat, and cautery methods are as yet only in their developmental state. The writer has always emphasized the fact that the surgical removal of the diseased organ and the removal of the contiguous tissues, together with the regional lymphatic glands, are principles which are just as necessary in the cure of uterine cancer as cancer in any other part of the body.

It is, therefore, appropriate at this time to emphasize the necessity of giving those patients, who present themselves in an operable stage, the benefit of surgical treatment, a procedure which conforms to the standard principles for the successful treatment of cancer.

#### SUMMARY.

The prophylaxis, and especially the early diagnosis, presents the greatest problem in dealing with uterine cancer. The radical abdominal operation thus far has given the highest percentage of cures in operable cases. Until radium,  $x$ -ray, or Percy's operation shall have proved their superiority to operation, their use should be limited to the inoperable cases. There is abundant clinical evidence at hand to prove the value of radiotherapy; it, therefore, seems logical to follow every palliative or radical operation with radiotherapy.

421 MICHIGAN ST.

#### DISCUSSION ON THE PAPERS OF DRS. PERCY AND JACOBSON.

DR. X. O. WERDER, Pittsburgh, Pa.—I have given the cancer question considerable attention for many years. For nearly twelve years I have used the cautery exclusively in the radical treatment of carcinoma of the cervix; carcinoma of the body of the uterus was treated by an ordinary vaginal hysterectomy or a pan-hysterectomy with such satisfactory results that a more radical operation was not deemed necessary.

The time of the discussion being limited to three minutes, I wish to confine myself to my own results obtained by the radical operation or igniextirpation as we call this operation. It was my privilege to present a paper before the American Congress of Surgeons in New York in November, 1912, in which I made a complete report of all cases treated up to that time by us, thirty-nine of them being operated upon over five years ago, eighteen of them living after five years or 46 per cent. At the present time the number of cases of carcinoma of the cervix treated by me, by the radical operation to date, is seventy-eight, with four deaths, a mortality of 5.1 per cent.;

Of these were operated upon over five years ago..	56
Number of patients living after five years.....	26 or 46.4 per cent.
Number of patients dead during five year period...	29
Number of patients not heard from.....	1

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Number of patients treated..... 56

While I fully realize that the number of cases treated radically by the cautery with such good result is not large enough to compare with some of the figures given by Dr. Jacobson, they would, at least, justify a more extensive use of the cautery especially in view of the low mortality the operation gives compared to the other radical methods. Unfortunately the cautery has been associated so long with palliative operations for cancer that the surgeons have lost sight of the fact that with a proper technic it is not only the safest but, I believe, the most effective agent in the radical treatment of cancer.

DR. E. A. WEISS, Pittsburgh, Pa.—I would like to say that many of the cases which Dr. Werder has reported I have seen personally, and the mortality rate, as well as morbidity, is decidedly less in his operation. It should be called the Werder operation, and certainly deserves a place in surgical literature.

DR. RUFUS B. HALL, Cincinnati, Ohio.—First, I want to commend Dr. Percy on his work. He is doing a wonderful work that has great possibilities. If we are able to control the heat it may have even greater possibilities. Like Dr. Werder, I have treated these cases of cancer for many years, but I am not in a position just now to give statistics, for I did not expect to take part in this discussion. I have risen simply to emphasize the remarks of Dr. Werder that in certain cases which are far advanced, I believe the operation of the electric cautery or of the soldering iron is worthy of a prominent place in connection with these different methods. Patients come to us whom we can offer very little hope, and perhaps only temporary relief, but the use of the cautery does cure some of these cases symptomatically, not for one year but for five years and longer. I believe that if any of these cases can be operated or are operable, they should be operated. If there is a recurrence, we can follow them up and treat them with the local heat. In these cases, where you have a recurrence, by the use of heat it will add greatly to their comfort and save some lives. This is worthy of trial, and if we can-

not cure them we can make their existence more comfortable. This we should do. The use of the cautery is certainly along the right line.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—I think better results can be obtained in advanced pelvic cancer if, in addition to the cautery, Dr. Percy will employ the preliminary application of the starvation ligature with lymphatic block. For about ten years I have made it a practice to precede the use of the Percy cautery, the Byrne cautery, the Doyen method, radium, or any other procedure that may seem indicated, by my operation of arterial ligation with lymphatic block, and have obtained better results than when this is not done. Even in the Wertheim operation I have found it advantageous to employ this preliminary procedure. It facilitates the control of hemorrhage, checks the malignant growth, in irremovable cases; it diminishes the absorption of poisonous products and facilitates the discharge of pus and necrotic tissue. The application of the additional measures is rendered easier and more satisfactory. The technic, briefly described, is as follows: After a free abdominal incision, one or more of the following arteries are ligated, according to the circumstances of the case: ovarians, internal iliacs, common iliac (in rare cases), uterines, obturator, and sacra media. Either before or after this ligation, the glands along the iliacs are removed *en masse* from the receptaculum chyli to the obturator foramen.

DR. PERCY (closing the discussion on his part).—There is so much to this subject that has been suggested by the discussion and by Dr. Jacobson's paper, that I will not try to enter into all of it. Of course, every one is interested in my mortality statistics, and I misled you in my paper when I said I had only lost two cases, and I am also glad Dr. Jacobson gave you the mortality table of other procedures. I do not know what my mortality is. I do not know how many of these cases I have treated. I have never looked them up, although my records are well kept. I have refrained from doing it simply because I have been interested in the problem of whether heat would cure cancer for a longer time than any other method. I have promised to give my statistics before the Gynecological Section of the American Medical Association next year in New York, and then I can answer some of these questions. I can say frankly I have absolutely refused no case. Why? Because I am deeply impressed with the possibilities of the resistance that I am convinced normally develops in these patients with the growth of the cancer mass. It is true that we do not know much about it yet I have been encouraged by pathologists who tell me that cases who die following the heat technic are found, at postmortem, with their metastatic glands undergoing a process of fibrosis such as described by Handley following a spontaneous cure.

I will tell you briefly some of the cases that are sent to me.

I saw a woman two years ago who was taking thirty grains of morphine a day. She was bed-ridden. She was cachectic. She had nearly a pound of cotton between her thighs and came to the

hospital in a Kelly pad because she stunk so that they could not keep her at home any longer. Now, no one with surgical judgment would touch a case like that, yet I did. These are the cases that make up the 90 per cent. of mortality according to Winter's formula. Schauta and Wertheim would not touch cases like that. Winter's formula does not apply to such cases. You cannot talk statistics when your files are filled with cases such as I have just related. In these terminal cases, if you please, the question comes up very properly whether I am not justified in saying that the Percy technic as far as this type of case is concerned is only palliative. I opened that woman's abdomen and what did I find? I found the internal iliac vein on the right side as large as her colon because filled with carcinoma cells. She had a carcinomatous mass in the sigmoid as large as a goose egg. She lived three months. Before she was operated and before she died, you could catheterize the uterus through a bivalve speculum in the vagina. She had a vesicovaginal fistula 2 inches in diameter, rigid and thick, due to carcinoma. What was left of her uterus sloughed out after the application of the heat. When the uterus came away a bivalve speculum introduced into the vagina showed a hole  $2\frac{1}{2}$  inches in diameter at the vault and beyond this a hole corresponding to the diameter of the pelvis and lined with granulation tissue. Three days before her death she developed a chill and died within forty-eight hours. Postmortem examination showed two large pyonephrotic kidneys, the sequelæ which my paper shows so often complicates uterine cancer. You could not put that case under the Winter formula. But here is the interesting and important thing: on postmortem there were no carcinoma cells in that right iliac vein. The mass in the sigmoid, which was as large as a goose egg, at the time of the operation was only the size of my middle finger nail. It had undergone a process of fibrosis and there were no carcinoma cells to be discovered in it.

DR. JACOBSON (closing).—I do not want to be put in the light of decrying Dr. Percy's work in any particular. I would not do that, because I believe in the Percy method in inoperable cases.

It is my thought that a résumé or summary of what has been done in carcinoma would be apropos at this time so as not to mislead our general physicians and surgeons from the main issue, in showing them what has been accomplished by surgery up to the present time.

I want to call special attention to Dr. Werder's statistics. He has told us that he has operated on seventy-eight cases up to the present with only four deaths, and of this number twenty-six, or 46 per cent., have survived the five year period. His results are better than those obtained by Wertheim.



## PRACTICAL CONSIDERATION OF SURGERY OF THE STOMACH.\*

BY

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A STUDY of the clinical histories of 497 operations on the stomach performed by my colleagues, Drs. F. E. Bunts and W. E. Lower, my associates at Lakeside Hospital, and by myself, suggests that the high mortality which accompanies the major gastric operations and the unsatisfactory postoperative results in certain cases, may be due in large measure to two principal factors: (a) a lack of complete coöperation between the surgeon and the internist; and (b) a tendency to consider the local lesion primarily rather than to *integrate* the patient; that is, to note every phase of the patient's condition that no contributing factor may be neglected.

*A. Coöperation between Surgeon and Internist.*—All the cases of gastric ulcer in our series had been under the care of internists; yet at operation large, hard ulcers were revealed—a fact that at first tended to shake our faith in the value of medical treatment in these cases. It then seemed as if resection of the ulcer must result in as final a cure as that which follows the excision of a uterine fibroid. But a study of the postoperative histories of our cases soon dispelled this illusion. Immediately after the operation our patients experienced a marked relief, and thus encouraged to believe that a final cure had been secured, they promptly returned to their former occupational and dietary habits, with the result that, in many cases, part or all of the old symptoms returned. It is well known that cases apparently cured by medical treatment also relapse frequently.

These facts suggest that a combination of medical and surgical treatment will yield better results than either alone. Gastroenterostomy alone may in a few days produce results that months of medical treatment fail to accomplish. For example, in three of our cases which had been under prolonged medical treatment, the large ulcer mass completely disappeared in the interval between the first and second stages of a two stage operation. The gastroenterostomy had

\*Read before American Association of Obstetricians and Gynecologists, Indianapolis, Ind., Sept. 26, 1916.

caused the ulcer masses to disappear as if by magic, and the proposed resections were no longer required. After the resection of the ulcer the clinical end-results will be much better if a modified Sippey treatment is insisted upon for a prolonged period—not less than a year.

The ideal plan of treatment therefore would seem to be:

*First.*—A trial of the Sippey or some similar form of treatment.

*Second.*—If a definite cure is not secured within a reasonable time by this means, one of three procedures should be employed, the choice depending on the individual case—excision of the ulcer, gastroenterostomy followed by excision, or gastroenterostomy alone. The benefit of gastroenterostomy is probably explained by the alkalization of the gastric juice by the bile; which, as has been shown by Paterson and others, is invariably found in the stomach after gastroenterostomy. Thus the alkaline factor of the Sippey treatment is secured automatically.

In these respects the treatment of gastric ulcer is analogous to the treatment of exophthalmic goiter, in which excision of a lobe of the thyroid only initiates the cure; final recovery being secured only after a year or more of a controlled regimen has been added.

*B. The Integration of the Patient.*—The principal function of the stomach and the intestines is to control the balance of material for constructive metabolism. It follows logically that any interference with the complete performance of this function will result in a drain upon the body's reserve stores of nutritive or energy-producing material. Since the margin of safety in the individual patient depends directly upon his nutritional reserves, it follows that if these reserves are greatly reduced then any operative procedure, even if technically perfect and performed with minimum trauma, may drain the depleted stores beyond the possibility of restoration. The course of treatment, therefore, and the choice of operative procedure must be governed by the state of the reserves of the individual patient.

#### THE ADAPTED SURGICAL TREATMENT.

*C.* It follows that no invariable rule of procedure can be enunciated. For the case that is presented early, before the nutritional balance has been unduly disturbed, an immediate resection of the ulcer or cancer-bearing area may be borne well, and recovery may be prompt. Such cases are rare, however, and these patients are usually emaciated and starved, sometimes exsanguinated, and in the majority of cases acidosis is present or impending. The first stage

of treatment must, therefore, comprise every possible means by which the depleted reserves may be restored. Water in large quantities should be given; sodium bicarbonate and glucose administered; rest in bed insisted upon; and sleep induced, by natural means if possible; if not, by artificial measures. Every energy-draining activity—worry, fear, anxiety, exertion—must be eliminated or minimized.

*Transfusion.*—In extreme cases the margin of safety may be widened by transfusion. In one of our cases the patient, apparently near death, was brought to the hospital in an ambulance and immediately a transfusion of blood under nitrous oxid anesthesia was given. Her immediate improvement was dramatic and so pronounced that gastroenterostomy was performed; this was followed, some days later, by a partial gastrectomy. The fundamental improvement of the patient began with the gastroenterostomy. She reported herself well six years later. In case perforation has occurred, the hemorrhage may be arrested by propping the patient upright in bed, so that she will be kept constantly on the verge of fainting, the fainting point being utilized as an indication that the blood pressure is sufficiently low to facilitate the coagulation of the blood. As soon as the hemorrhage has ceased the patient is allowed to lie down in order that the circulation through the brain may be restored. This procedure, which in our experience in three instances, has adequately arrested internal hemorrhage is in accordance with the biologic principle that the coagulability of the blood increases rapidly with the lowering of the blood pressure. Low blood pressure produces anemia of the brain, which in turn occasions fainting. It is logical, therefore, to utilize the fainting point clinically as a remedy against internal hemorrhage.

*The Graded Operation.*—With the starved patient no anesthetic and no narcotic is safe. Anesthetics increase acidity; morphin does not increase acidity, but does interfere with neutralization; physical trauma increases acidity. It follows that the safety of the patient demands that each of these acid-producing factors be reduced to a minimum. Psychic relief may be safely secured by bromides administered by rectum. Just enough nitrous oxid is given to produce a twilight anesthesia; the technic of anociation is employed throughout the operation. In starved cases in which the margin of safety is very narrow, von Eiselsberg's method gives excellent results. A jejunostomy is first performed under local anesthesia, the final operation being delayed until a safe margin has been secured by feeding. Gastroenterostomy alone is more easily borne

than gastrectomy, as the wound is not so extensive as in the latter operation and the physiologic and anatomic readjustment is readily made; and, as we have already stated, the functional readjustment after the gastroenterostomy may be so complete as to obviate the necessity for the second operation. In such cases, a massive chance is taken; not only is there an unnecessary hazard as to life, but a needless operation may be performed.

*Special Points in Technic.*—No rule regarding the length of the jejunal loop can be made; it must be so adjusted in each individual case as to lie comfortably and easily. If the mesocolon be thick a larger loop may be required than is usual; for the same reason a wider opening must be made in the mesocolon.

*The position of the stoma*, like the length of the jejunal loop, depends upon the necessities of the case. In general, it is better to make the stoma as near the pylorus as is mechanically possible; it should be done along the middle zone and parallel to the long axis where there are the fewest blood-vessels. Thus the stomach will lie comfortably upon the jejunum. The size of the stoma is of the same vital importance. If the anastomosis is too short, the resultant tension may cause an obstruction. In case this occurs the tension on the anastomosis may be temporarily relieved by placing the patient in a markedly head-down position. To secure permanent relief, another operation of course is required. On the other hand, if the anastomosis is too long, obstruction may result from an invagination of the jejunum into the stomach.

*We do not believe in suturing the rent in the mesocolon* upon the line of suture between the stomach and the intestine, as kinking is apt to result. For this reason we suture the mesocolon about an inch above the anastomosis. In our experience we have found that a sharp knife dissection gives a more definitive, purposeful control of the mesocolon opening than either a blunt perforation or a tear by traction.

We use chromic catgut for the first line of sutures; these are reinforced by interrupted right-angled silk sutures which include the muscularis. To insure absolute safety against hemorrhage and leakage the shoemaker or cobbler stitch is used for the main suture.

*Postoperative Treatment.*—During the patient's postoperative stay in the hospital the prime effort should be the restoration of the patient's reserves. To this end, as in the preoperative period, water and nutrition are forced; acid-producing factors are eliminated from the patient's environment as far as possible; and, above all else in importance, sleep is induced by every possible means. While

rest in bed under ideal conditions may prevent further drain upon the patient's reserves, the restoration of the energy-storing and energy-transforming organs is accomplished only during sleep.

As we have already stated, upon leaving the hospital the patient should enter upon a carefully planned and strictly enforced regimen of conduct and diet for a period of at least a year. The surgeon of necessity parts with most of his patients at the hospital door. Whether or not the surgical treatment of his gastric patients will prove finally effective depends in large measure upon the home physician.

#### SUMMARY.

Since we have appreciated the significance of these factors in gastric cases, and have planned a complete regimen covering the preoperative period, each step in the one or two stage operation, the postoperative period in the hospital, and a year's after-care, the mortality rate in 144 operations has been reduced to less than one-third the former mortality of gastric operations. The post-operative morbidity, too, has greatly decreased.

OSBORN BUILDING.

#### DISCUSSION.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—I rise to make a statement regarding the moving picture in teaching surgery. Most of you will remember that in 1913, at the Providence meeting of this Association, I illustrated local anesthesia in hernia operations with a thousand feet of film. At that time, so far as I was able to determine, it was the first moving picture demonstration for teaching surgery in this country. I left my paper in charge of Mr. Whitford, our official stenographer, with the request that he write something about the demonstration for publication in the transactions. This was in some way overlooked, and it did not become a part of our transactions. I wish to make this statement because of the prominence which the moving picture is now being given in the teaching of surgery.

Dr. Crile has given us an entirely new idea in the animated drawings, and from what I have seen I should say that they are of considerable advantage. With the moving picture anything that can be brought to the surface can be easily shown. The animated drawings will find the greatest use in showing deep structures which cannot be shown by pictures. In taking moving pictures it is entirely a matter of light in the operating room, and the person who manipulates the camera should understand the steps of the operation. It seems to me that a film composed of a combination of animated drawings and moving pictures would be ideal. I believe the moving picture and the animated drawings in surgical technic have come to stay.

## APPLYING THE ANIMATED DRAWING TO THE TEACHING OF SURGICAL TECHNIC.\*

BY

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(With one illustration.)

IN our clinic during the past three years we have tried to illustrate surgical technic by every possible method. To this end we have made pen and ink, color, and half-tone drawings; we have employed stereoscopic, plain, and color photographs; we have tried clay modelling. Nevertheless, there have been some problems which it has been impossible to illustrate clearly by any of these methods. A few months ago, however, we found that these difficulties might be solved by the use of animated drawings.

Our surgical books and magazines, as well as practically all textbooks in surgery and anatomy, are illustrated with drawings and diagrams, the photograph seldom being used for these purposes. If the drawing is better than the photograph for books and magazines, it naturally follows that the animated drawing is superior to the animated photograph, especially when utilized for the teaching of surgical technic.

I wish to illustrate, by means of a film, how the animated drawing can be used for teaching purposes. The first part of the reel shows a motion photograph of the cobbler stitch. The operative field has been cleared of every obstruction in the way of unnecessary instruments and gauze, so that only the hands of the operator appear while the stitch is being made. This gives the clearest demonstration that is possible with motion photographs (a). Part two of the film is a repetition of the same stitch, but the animated drawing is used for the demonstration. No hands, no instruments, and no other obstructions interrupt a close observation of the maneuvers of the needles. A clear and accurate demonstration of this most difficult stitch is the result (b).

That the same principle applies to the demonstration of instruments is proved by a motion photograph of gloved hands showing the use of the trocar and cannula for suprapubic puncture, followed by an animated drawing of the same instrument in use (c). The

\* Talk accompanying animated drawing film, shown before the American Association of Obstetricians and Gynecologists, Indianapolis, Ind., September 26, 1916.

high lights and shadows of these instruments cannot be controlled in photograph, but in the drawing the important points are emphasized, while the unimportant are subdued or entirely eliminated. The remainder of the film is devoted to the possibilities of the animated drawing for teaching purposes, as emphasized in demonstrations of surgical technic for deep dissection.

Schematic drawings and diagrams can be utilized to show the exact technic of any procedure. The film which shows the infiltration of

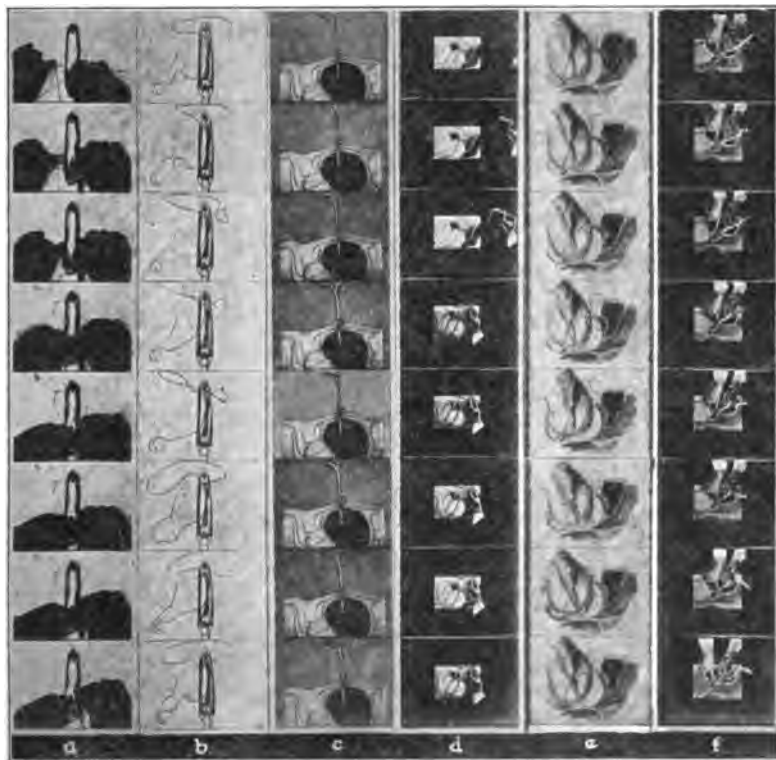


FIG. 1.—Pictures from the "Animated Drawing" film.

Each of the above strips represents a half second of pictures when projected on the screen. (a) The clearest demonstration possible with motion-photographs of the cobbler-stitch. (b) The same stitch in animated drawing. (c) Demonstrating an instrument. (d) Infiltration in deep dissection. (e) The removal of the prostate gland. (f) Packing over the cavity with gauze.

the skin and the subcutaneous tissues demonstrates clearly the superiority of the animated drawing in depicting superficial technic. For deep dissection, however, the animated drawing is indispensable. Since a photograph is impossible, the animated drawing is the only means of illustrating surgical technic in the deep and hidden por-

tions of the body. To demonstrate this point, the film shows a technic for performing a shockless suprapubic prostatectomy. By means of cross-section drawings of the pelvis, the infiltration of the capsule is first shown (d), then the enucleation of the prostate, and finally the removal of the gland (e), and the packing of the cavity with gauze. None of these procedures can be seen in the actual operation or followed by the camera. In the animated drawing they are clearly demonstrated.

One obvious advantage of the animated drawing is that it can always be kept up-to-date, since changes can be made at any time. Obsolete or undesirable parts can be eliminated and new ones inserted or added. Another advantage is that the artist never needs to wait for a particular time, or patient, or surgeon. If the technic has once been worked out, he can make his drawings at any time, without delay or inconvenience to anyone.

Think of the possibilities of the animated drawing for the teaching of embryology and obstetrics offers another field for the use of the animated drawing. The development of the embryo, from conception until birth, could be shown in a few reels. Then, from the original film any number of other films could be inexpensively made and distributed to the hospitals and colleges all over the country for teaching nurses and medical students this most complicated and important part of their training.

It will thus be seen that the animated drawing is not confined alone to illustrating points in surgical technic, but can be as readily applied to any other department of medical teaching.

1021 PROSPECT AVENUE.

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## THE MECHANICS OF THE STOMACH AFTER GASTRO-ENTEROSTOMY.\*

BY

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Toledo, Ohio.

THE modern method of fluoroscopic examination of the gastrointestinal apparatus has given the abdominal surgeon a new means of following up and determining the anatomical and physiological changes which result from operations on the stomach and intestines.

Such post-operative x-ray studies will teach the surgeon much regarding the mechanism of the stomach and also serve as a guide in future operations of a similar nature. Even though the surgeon has

\* Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.



endeavored to place his anastomotic opening always in the same position in the stomach, he will be surprised at the differences in the site of the stoma, the variations in stomach tonicity, peristalsis, and especially of the emptying power of the stomach. That this follow-up method has not been generally practised is evidenced by the few reports of such examinations in our literature as compared with the vast number of stomach operations which have been performed.

What becomes of the new opening in the stomach after gastroenterostomy? Does it functionate in the presence of a patulous pylorus? Is gastroenterostomy a drainage operation? Is it always necessary to occlude the pylorus when gastroenterostomy is performed? Do such artificial occlusions remain permanently closed? All these are questions upon which there has been until recently little unity of opinion. The following is a résumé of the literature together with a report of personal observations in seventeen patients on whom a gastroenterostomy operation had been performed.

Cannon and Blake(1) based their observations upon experiments on lower animals. The impression has been gained from Cannon's work that the new anastomotic opening in the presence of a patent pylorus will close in time. This impression was probably based upon Cannon's observations in his experiments on cats, that when the opening was not in the antrum pylori, food and even fluids were pushed through the pylorus rather than through the new opening. This occurs when both ways are opened. They also observed the circulation of food through the pylorus to the duodenum and back through the anastomosis into the stomach not followed by a vicious circle. Cannon determined that the pylorus is the lowest part when the stomach is empty; that the intragastric pressure is three to four times greater at the pylorus than at the cardiac end; and that an artificial stoma should be large and as near the pylorus as possible.

Pers(2) 1909, reported his postoperative radiographic study of forty patients. In thirty-eight cases evacuation of the stomach was observed occurring through the anastomosis and much more quickly than the normal pylorus evacuation. In one case it seemed that the pylorus was used somewhat and in the other cases both openings appeared to functionate. The pictures, Pers observed, varied much according to the case. Evacuation of stomach contents sometimes commenced about one-quarter of an hour after the meal; in some cases while the patient was still eating. Pers divided his observations into three groups; in the first the stomach does not commence to evacuate

until very late, and empties in about one and one-half hours; in the second group the stomach empties immediately after food enters, and is entirely evacuated in from twenty to fifty minutes; in the third group the bismuth meal escapes as soon as it enters the stomach, and is evacuated in from ten to twenty-five minutes. The normal emptying time is from four to five hours. These results show that the stomach, including the pylorus, is filled in the first two groups, but not in the third group. Pers concludes that the gastroenterostomy anastomosis always functionates regardless of permeability of the pylorus, and that the stomach empties so rapidly that a gastroenterostomy may be considered a drainage operation.

Ribas(3), 1910 to 1911, reports observations similar to those of Pers, that there are three types of gastroenterostomy stomachs: *A.* Those which contract energetically and pass the contents rapidly to the intestines. *B.* Those in which contractions are delayed from twenty minutes to one hour. *C.* Those in which contraction is delayed from one-half to three hours after the bismuth meal enters the stomach.

After the operation of gastroenterostomy the radioscopic screen affords a means of examination of equal value to that of the stomach tube. It is, moreover, quite painless, and much more agreeable to the patient than the introduction of a stomach tube.

Radioscopy not only indicates the movements of the stomach, but also their energy and quality. The screen examination not only enables us to form an adequate prognosis in cases of gastroenterostomy, but assists us in formulating the dietetic and therapeutic treatment.

The ejection of the bismuth meal, as seen by the radioscopic screen, takes place sooner than the evacuation of a test meal introduced by the stomach tube, but this does not invalidate the method since the earlier evacuation is due to the bismuth which acts as a foreign body and stimulates the muscular contractions. Apart from the time, there is a definite relation between the findings on the fluoroscopic screen and the clinical observations.

The active contracting portion of the stomach is the horizontal limb, and of this portion the last to lose its contractile power is the antrum pylori. This fact shows the necessity of opening the antrum pylori in the operation of gastroenterostomy.

Ribas thinks that in those cases of gastroenterostomy in which some permeability of the pylorus persists, the new anastomotic aperture closes after a time, and the original pyloric opening resumes its function.

Schuler(4) in 1911 published his studies based upon accurate observations of patients upon whom gastroenterostomy had been performed. Some of his cases were pylorectomies for cancer, and in some others the anterior gastroenterostomy had been made; therefore, his observations are not without defect. Screen examinations showed that a gastric enterostomy placed at the declivity part of the stomach fundus, does not in any way modify the form, the mode of repletion, the situation, nor the mobility of the organ. Evacuation in all Schuler's patients was made at least in part by the pylorus. In the normal stomach of dogs Schuler states that a gastroenterostomy made at the level of the antrum pylori or at the declivity point of the stomach fundus, does not sensibly modify the physiological evacuation by the pylorus; the greater part of the food continues to pass by that orifice.

If there is evacuation through the artificial opening it is not continuous; generally it is synchronous with the pyloric evacuation when that opening is on the antrum. It is irregular and independent of the pyloric contraction when the opening is on the stomach fundus. A gastroenterostomy made on the fundus obliterates quicker than if made on the antrum. This is also the case in man.

The studies of Hartel (5), 1911, are worthy of special note. This author's report is based upon the very elaborate study of twenty-two cases of gastroenterostomy, mostly about one year to one and one-half years after operation. In the majority of cases the operation was a posterior mesocolic one. Radiography showed that the gastroenterostomy stomach fills like a normal one; only the pyloric region more slowly and more incompletely than in the physiological state. Emptying of the stomach commences at the beginning of ingestion, but is only progressively completed. Evacuation is not more rapid than in a normal stomach. Either the pylorus or the anastomosis may be utilized for evacuation; but no matter what the condition of the pylorus, the anastomotic opening always gives passage to some other contents. The part, however, played by both openings varies according to conditions.

Gastroenterostomy does not noticeably modify the progress of peristalsis. The stomach contractions persist and push the food toward the pyloric opening even if it is impermeable. Special conditions which modify the emptying are an organic stenosis of the duodenum, pylorus, or any part of the stomach; evacuation is then exclusively by the anastomosis. If there is a pyloric lesion without stenosis, evacuation is both by pylorus and anastomosis. Hartel

thinks that persistence of pyloric permeability does not cause a progressive retraction of the anastomotic orifice. In two of his cases with complete pyloric permeability, the gastroenterostomy remained patent, two and seven years after operation. Closure of the anastomotic opening is due to a pathological condition (ulcer developing at the site, etc.) and not to a defect in the function of the new stoma.

Caillé Durand and Marre(6) have reviewed forty-five cases of gastroenterostomy. From their clinical and radiographic studies they have shown the great frequency of simultaneous function in both pylorus and anastomosis. This may be observed shortly after, or some years after operation, and it happens among those who no longer have symptoms as well as among those who have.

Hess(7), 1912, examined thirty-one gastroenterostomized patients with the radiosopic screen. He concludes that the results given by a number of previous observers based on a small number of cases ought not be generalized. Of the thirty-one gastroenterostomies, twenty-seven were retrocolic operations.

Hess finds: (1) That a good functioning anastomosis does not exclude a persistence or return of gastric troubles. (2) That in old cases in which the anastomosis functionates well, the pylorus appears closed. (3) That, reciprocally, when the pylorus continues to functionate, the anastomosis is generally no longer permeable. (4) That in the majority of cases the duration of gastric evacuation is accelerated, sometimes considerably so, up to the time when the level of the gastric contents leaves the mouth of the anastomosis uncovered, when, it is then reduced in rate. (5) That gastric atony may be ameliorated following operation, but not always; moreover, that atony does not necessarily influence evacuation, for this can be perfectly accomplished in stomachs apparently quite atonic.

Hess states that new radiological observations should be made to determine definitely whether the pylorus ought to be closed to attain prolonged functioning of the anastomosis.

Zweig(8), 1913, advanced the idea that the spasmodic closure of the gastroenterostomy opening is responsible for many bad results. In many of his patients who were nervous there was sufficient permeability of the pylorus as shown by the radiograph, yet vomiting persisted. Excitation of the vagus brought about hypertony of the stomach musculature and caused closure of the orifice.

Matthew and Savignac(9), 1913, say that intermittent or continuous diarrhea and abdominal pain after eating are phenomena due to atony and great dilatation of the stomach.

Radioscopic examinations show that gastrocolic fistula, partial

stenosis of the small intestine, and jejunal ulcer are produced in patients in whom the emptying of the stomach through the gastro-jejunal anastomosis takes place with rapidity. The pathological causes may be the lack of gastric secretion, and the arrival of the food in the intestines without admixture of normal gastric secretions. Distention, irritation (both chemical and physical) in the intestines, and neuropathies are observed in such patients.

Hertz(10), 1913, reported that in patients after gastroenterostomy where the stomach empties too rapidly, the stomach was too small and hypertonic. Little or nothing passes through the pylorus if open. The stomach empties much less rapidly when the patient assumes the recumbent position after a meal. He observed that in cases of extreme dilatation when the patient is in the vertical position the whole of the gastric contents accumulates in the lowest part of the stomach in such a way that the upper limit of the food is below the pylorus. In such cases nothing can leave the pylorus until the patient lies down, and an effective gastroenterostomy must have the stoma so situated that it remains in the most dependent part of the stomach even when the vertical position is assumed.

Mallory(11), 1914, pointed out the influence of the vagus nerve on the results following gastroenterostomy. He stated that if the stoma is made of the usual size and in the correct location, it will functionate properly. If the neuromuscular mechanism is hypertonic and hypersensitive, it is not removed by operation, and spastic contraction continues after it. Röntgen examinations, unless made just at the time of a spasm, will show the stoma open. The surgical remedy is to recognize vagotomy before operation. He draws attention to the effects of disturbances of innervation, on the secretory motor, and sensory functions of the stomach both before and after operation.

Mayo, C. H.(12), 1914, stated that if a gastroenterostomy opening is made far into the greater curvature, the less effectual is the drainage. A gastroenterostomy thus located requires efforts at pyloric closure to improve delivery. But if the opening is made toward the pylorus the peristaltic contractions will start the contents toward the intestine through the new opening. Such a gastroenterostomy will deliver the gastric contents even if the pylorus is open.

The most complete résumé of this subject is given by Hartman(13), 1914. He combats the idea that when the pylorus is permeable the gastric jejunal orifice does not functionate and tends to obliterate.

If such orifices close it is only because a cicatricial tissue is developed at their level, as a result of defects in the primary union, or

because there was a secondary development of an ulcer with subsequent cicatrization at the level of the anastomosis.

In answer to the inquiry whether gastrointestinal orifices are physiologically useless in the presence of pyloric permeability; Hartman thinks this depends entirely on the position of the orifice. Experimentally he found: (1) When the orifice is near the pylorus, the greater part of the gastric contents passes through the new opening, and little if any, through the pylorus. (2) When the orifice is placed far from the pylorus on the cardiac part of the stomach, almost all the contents pass through the pylorus. These facts agree with the observations on the human subject. In almost all of his gastroenterostomized patients who have a large opening on the pyloric antrum he has observed that almost the entire contents will pass through the anastomosis.

In order that the gastric contents pass from the stomach to the intestines, it is necessary that the pressure to which it is submitted must be stronger than the tension of the intestinal contents. Experiments show that while very weak in the cardiac part, the pressure is increased in the pyloric part and this is raised considerably at the moment of gastric contraction.

It is easy to understand from physiological considerations that juxta-pyloric orifices will functionate even when the pylorus is normal, and that orifices on the cardiac part will remain useless from the evacuation point of view.

Case(14), 1915, also stated that the stoma should be fairly large and near the pylorus; that conditions which stretch the stomach should be avoided; and that several centimeters of distal intestine should be attached to the stomach to prevent kinking in the jejunum. Cannon and Blake thought that pyloroplasty, when possible, was the operation of choice, that rapid exit of food from the stomach was prevented by rhythmical contracting rings formed in the duodenum. Case has found this to be true, in several patients in which either a Finney operation or an ordinary gastrojejunostomy has been done, *i.e.*, a sort of sphincter action about 3 to 6 centimeters below the gastrojejunostomy opening. This contracting ring just below the opening simulates the normal action of the pyloric sphincter.

Case has also observed stagnation of food in the jejunum at or near the site of gastroenterostomy, especially toward the end of the gastric clearance—apparently in the small bowel at the site of the anastomosis. This stasis may be accounted for by the inhibition of onward peristaltic activity.

In order to determine the mechanical function of the stomach following gastric operations, Doctor Murphy has made fluoroscopic observations on seventeen of our patients.

The gastroenterostomy in this series of cases was always a posterior vertical no-loop operation, and was performed six times for duodenal ulcer, seven times for gastric ulcer, and three times for adhesions about the pylorus, and in one instance a pylorectomy with gastroenterostomy was performed for benign pyloric stenosis. A detailed account of each operation with radiographic findings is given in Table.

The observations range from two months to four years from time of operation. Although this period may not be of sufficient duration to make positive conclusions regarding the ultimate patency or closure of the new stoma, yet in no instance did we observe a closure of the opening. In every instance the patient stated that he was either entirely relieved of his original symptoms or was very greatly improved. All could be classified as symptomatically cured.

A series of fluoroscopic observations on patients operated five or more years would be of considerable importance in making final conclusions.

The technic employed in making these observations was as follows: The patient was placed before the fluoroscopic screen in an upright posture and given 2 ounces of water and 1 ounce of barium sulphate, after which 4 ounces of barium and 16 ounces of buttermilk were given. The normal emptying time for such a barium meal is about four hours.

In sixteen of our simple gastroenterostomy cases the pylorus was occluded three times; for this closure the round ligament of the liver was used once, and in the two other instances a suture with linen was used. In the single case where the round ligament was used, the pylorus was not patent eleven months after the operation, and in the other two cases, one was not patent after fourteen months, and the other after five months. In five cases the ulcer of the duodenum was inverted by linen suture and with one exception, the pylorus was patent in all. These cases invariably showed some retardation of the food through the pylorus. In two instances food passed out of the stomach so rapidly that no food reached the patent pylorus. In every instance where both the pylorus and stoma showed the passage of food, most of the food passed through the stoma.

The situation of the opening and its size has much to do with the emptying time of the stomach following gastroenterostomy. As a

TABLE.—FLUOROSCOPIC OBSERVATIONS FOLLOWING GASTROENTEROSTOMY.

No.	Sex	Age	Time since operation.	Type of operation and pathology	Pylorus at time of operation	Motility	Emptying time of barium meal	Pyloric patency	Gastroenterostomy opening	Stasis in loops	Type of stomach
1	Male.	55	9 mo's.	Post gastroenterostomy. Adhesions about pylorus; cholecystitis, chro. appendicitis.	Pylorus not sutured.	No peristalsis.	Very rapidly at first. When stomach was filled more slowly. All out in 4 hours.	Patent. Cap was filled. Food could be forced through at any time.	Patent. The opening does not seem near very pylorus.	None.	Orthotonic.
2	Male.	42	5 mo's.	Post gastroenterostomy. Gastric ulcer on lesser curvature.	Occlusion of pylorus by suture of linen.	No peristalsis.	Stomach nearly empty in 1½ hours. Entirely empty in 3½ hours.	Pylorus did not fill nor could any be forced through at 1½ hours.	Patent, opening close to pylorus. Food ran out at once.	The loop close to stomach was filled in 1½ hours. Some peristalsis seen in duodenum. Loop was filled but not distended. Food could be forced back through opening.	Hypertonic.
3	Male.	38	8 mo's.	Post gastroenterostomy and pylorotomy at operation. Obstruction of pylorus, carcinoma.	Pylorotomy.	Normal peristalsis.	None passed out for 5 minutes; then it began emptying rapidly. Very small residue in 4 hours.	Pyloric end did not fill.	Patent. The opening is near the end of the stomach.	None.	Slightly hypotonic.
4	Male.	46	1 yr. 9 mo's.	Post gastroenterostomy. Ulcer on posterior surface of duodenum.	Pylorus narrowed by suture of linen.	No peristalsis.	Began to go through at once. Almost empty in 1½ hours.	Patent duodenal cap filled.	Patent. Opening near pylorus.	First loop became very full. Slight accumulation at opening at end of 2 hours.	Orthotonic.
5	Female.	35	1 yr. 5 mo's.	Post gastroenterostomy. Adhesions about pylorus and duodenum.	Pylorus not sutured.	No peristalsis.	Almost empty at end of 30 minutes.	Pylorus filled but none could be forced through. None passed through in right lateral position.	Patent. Opening not so near pylorus. Food ran to right.	None.	Orthotonic.
6	Male.	55	11 mo's.	Post gastroenterostomy. Gastric ulcer on lesser curvature.	Pylorus occluded with ligament of liver.	No peristalsis.	Did not go through at once. Opening at very near pylorus. Small residue in 4 hours.	Not patent.	Patent. Food did not leave so very fast.	None.	Hypotonic.



7	Male.	23	2 mo's.	Post gastroenter-ostomy. Duodenal ulcer.	Inversion of duodenum over ulcer.	Deep peristalsis.	Did not go through at once. All out but a very small amount in 2 hours.	Duodenal cap filled but none went beyond. Pylorus patent.	Patent. Only small amount went through in 20 minutes.	None.	Hypertonic.
8	Female.	50	3 mo's.	Post gastroenter-ostomy. Duodenal ulcer.	Inversion of duodenum over ulcer.	No peristalsis.	Did not empty fast at first. Empty in 1 1/4 hours.	Patent.	Patent. Opening seems to be near pylorus.	None.	Hypotonic.
9	Female.	45	11 mo's.	Post gastroenter-ostomy. Ulcer on lesser curvature about to perforate.	Pylorus not sutured.	No peristalsis.	Ran out as fast as it entered. All out in 5 minutes.	Patent.	Patent, near pylorus.	None.	Hypertonic. Spastic in drawing on greater curvature.
10	Male.	36	2 yrs. 8 mo's.	Post gastroenter-ostomy. Perforated gastric. Ulcer on lesser curvature near pylorus.	Inversion of pylorus about ulcer.	Normal.	All out in 1 1/4 hours.	Not patent.	Patent.	None.	Orthotonic.
11	Female.	46	4 yrs.	Post gastroenter-ostomy. Ulcer on lesser curvature.	Pylorus not occluded.	No peristalsis.	All out in 5 minutes.	Never filled. Stomach emptied too rapidly.	Patent.	Stasis in loop near terminal ileum due to adhesions.	Hypertonic.
12	Male.	28	14 mo's.	Post gastroenter-ostomy. Severe hemorrhage from gastric ulcer.	Pylorus occluded by suture.	No peristalsis.	All out in 30 minutes.	Not patent.	Patent.	None.	Orthotonic.
13	Female.	30	2 mo's.	Post gastroenter-ostomy. Duodenal ulcer.	Inversion of ulcer by suture.		Very rapidly.	Not observed.	Patent.	None.	Not stated.
14	Male.	35	2 mo's.	Post gastroenter-ostomy. Duodenal ulcer.	Pylorus not closed.		Very rapidly.	Not observed.	Patent.	None.	Orthotonic.
15	Male.	36	2 yrs. 5 mo's.	Post gastroenter-ostomy. Ulcer on lesser curvature.	Pylorus not closed.	No peristalsis.	Rapidly. Small residue in 4 hours.	Pylorus did not fill.	Patent.	None.	Orthotonic.
16	Male.	35		Post gastroenter-ostomy. Adhesions about pylorus and gall-bladder.	Pylorus not closed.	No peristalsis.	All out in 1 hour.	Not patent.	Patent.	None.	Hypotonic.
17	Female.	55		Post gastroenter-ostomy. Duodenal ulcer.	Inversion of ulcer.	Some peristalsis.	Small residue in 3 1/2 hours.	Patent. Duodenal cap filled.	Patent. Small.	None.	Orthotonic.

rule, it may be stated that the nearer the pylorus and the larger the opening, the more rapidly does the stomach empty.

In every case the stomach emptied itself more quickly than is the case in a normal stomach. It is for this all-important reason that the impressions gained were that a gastroenterostomy is a drainage operation. In eleven of our cases the fluoroscopic observations regarding the motility were made previous to operation, and in every instance the operation showed shorter emptying time.

It has been claimed by some writers, notably Patterson, that the good effects of gastroenterostomy are due to chemical changes in the gastric secretions, that there is lessened hyperacidity, due to the presence of bile and pancreatic juices in the stomach.

It is probable that both the drainage factor and the chemical changes are responsible for the cures of gastric and duodenal ulcers after gastroenterostomy.

#### CONCLUSIONS.

1. That all patients examined in this series were uniformly well.
2. That gastroenterostomy openings properly made and placed do not obliterate.
3. That the gastroenterostomy openings functionate equally as well as in the presence of either an open or closed pylorus.
4. That it is not necessary to artificially occlude the pylorus in gastroenterostomy.
5. That the gastroenterostomy opening to secure the maximum amount of drainage must be of ample size and placed as near the pylorus as possible, preferably in the antrum pylori. Such openings must not be made on the fundus of the stomach nor on the lesser curvature.
6. That gastroenterostomy is essentially a drainage operation.
7. That serious distention in the jejunum does not occur after gastroenterostomy, the food is seen to pass rapidly through the many loops of the small intestine before it finally stops. Even in those patients who are entirely relieved of their former symptoms food can be forced backward into the stomach from the jejunum, and although this can be done easily, such regurgitations do not seem to make any difference.

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VALUE OF PAIN, JAUNDICE, AND TUMOR MASS IN  
THE DIFFERENTIAL DIAGNOSIS OF DISEASES  
OF THE RIGHT UPPER QUADRANT OF  
ABDOMEN.\*

BY

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IN differentiating the various diseases of the upper right quadrant of the abdomen, pain, jaundice, and tumor mass are the most frequent and striking symptoms, each of which is of great value in the conditions in which each one occurs, if the peculiarities and characteristics common to each condition are kept in mind. A diagnosis may be based on a proper interpretation of these symptoms. Upon the correctness of the observations of the symptoms depends the accuracy of the diagnosis. If the observations are correct, the diagnosis will be correct; if the observations are wrong, the diagnosis will be wrong.

It will be seen that pain, jaundice, and tumor mass—especially the first and last—are the most important determining factors in a differential diagnosis of diseases of the right upper quadrant. While I do not exclude other factors in making a differential diagnosis, the characteristic pain and tumor mass are the most important factors in the differentiation, certain lesions are often so situated and so obscured that a diagnosis is difficult—often impossible. There is no field in the domain of surgery where it is more important to place a proper valuation upon the patient's history, subjective symptoms, and the laboratory findings than in diseases of the right upper quadrant.

To differentiate the diseases in the right upper quadrant of the abdomen, it is necessary to differentiate the most important inflammatory and obstructive conditions producing pain, jaundice or tumor mass that affect the pyloric end of the stomach, pancreas, duodenum, liver, gall-bladder, bile ducts, kidney and appendix. The diseases affecting these organs are usually referred to individually and separately. They are not often treated as a group of organs whose diseases present a symptomatology very closely related.

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These organs are at times closely situated, instead of being a good distance apart, as shown by their anatomical relation.

The usual symptoms of peptic ulcer are pain, vomiting, and hemorrhage, the most important of which is pain. Pain is the earliest definite symptom which is usually aggravated by large amounts of food and often relieved by small amounts. Pain may come on during the ingestion of food, but more frequently it comes on a few hours after meals and at night. Gastric ulcers are often characterized by periods of long remission. Intermittency takes place for long periods of time, during which the patient often believes himself well; then, without apparent cause, he finds that he has a return of the old trouble. Pain is more constant than vomiting; it usually precedes vomiting and is often relieved by vomiting.

Gastric analysis is important in working up these cases. If the gastric contents is more than 100 c.c., it is abnormal and indicates hypersecretion, spasm, and pyloric obstruction. The contents should be tested for continued hypersecretion and acidity. "About 70 per cent. show a hyperacidity; a few show a normal acidity; about 5 per cent. show a hypoacidity, and a few show lactic acid."

Occult blood will be found in a large per cent. of ulcer and is of great value in the diagnosis. Friedenwald says that the occasional presence of occult blood in the stool is suggestive of ulcer, but its continued presence from day to day is suggestive of carcinoma.

The x-ray examination will often be a helpful aid in determining the presence of peptic ulcer. Much valuable information may be secured by the röntgenologist, many of whom claim to diagnose 75 per cent. of ulcers.

Peptic ulcer diagnosis is usually based upon the presence of localized pain, followed by vomiting, frequent presence of occult blood in gastric contents or stools, hypersecretion, increased amount of gastric contents, reliable findings with the x-ray, and often a history of an old irritated dyspepsia.

Hemorrhagic pancreatitis is sudden and violent in onset. It is characterized by excruciating, deep-seated pain usually in the epigastrium or between the xiphoid and umbilicus, associated with severe nausea and vomiting, hiccough, constipation, and albuminuria frequently results, if patient does not die in speedy collapse.

Acute suppurative pancreatitis usually begins suddenly with severe epigastric pain, vomiting, hiccough, chills, an irregular pyemic temperature, and progressive tympanites. Prostration is usually great.

In pancreatic calculi paroxysms of pain may be due to the impac-

tion of stone. The pain radiates along the lower left costal border to the back rather than to the right side. Detection of free fat in stools or glycosuria may markedly aid in the diagnosis. Characteristic calculi found in the stool is confirmatory. Jaundice rarely appears in pancreatic lithiasis unless the stone passes into the common duct and becomes lodged. If this takes place, or if pressure is made upon the common duct by inflammatory swelling, jaundice may occur.

In cholecystitis pain may or may not be very severe, depending largely upon the amount of obstruction produced by the swelling in the ducts. If the obstruction is complete, the gall-bladder may become enormously enlarged, extending pear-shaped below the right costal margin to the umbilicus. Epigastric pain with local soreness beneath the right rib margin is usually followed by nausea and vomiting. When the common bile duct is occluded, jaundice with chills and high temperature may result.

Cholelithiasis may exist a long time without symptoms. I had a case:

A Mrs. I., thirty-five years of age, who had had five children. She gave a history of having had typhoid fever at fourteen years of age, but not until thirty-five years of age did she ever have a symptom referable to the gall-bladder. She was taken with severe pain in the epigastrium, with great tenderness over the gall-bladder. I operated and removed 165 gall-stones. Not until one of the stones became lodged in the cystic duct did she have trouble referable to the gall-bladder. When stones become lodged in the duct so as to obstruct the flow of bile or mucus, sudden pain of an agonizing character results.

Cholelithiasis is usually preceded by some remote infection—typhoid fever, dysentery, appendicitis and cholecystitis—and may come on suddenly or gradually. Pain usually begins in the epigastrium or beneath the right costal margin and is often referred to the right shoulder blade and down the arm and sometimes beneath the sternum.

If the stone lodges in the common duct, it prevents the free flow of bile and jaundice results. Chills with high temperature may develop in connection with extreme jaundice, which, if not soon relieved, will lead to a subnormal temperature, with slow pulse and white pasty stools.

If the gall-bladder should happen to be located on the left side, it would be difficult to differentiate by the pain and tumor mass from gastric tumor.

Renal calculus is accompanied with severe pain when the stone

gets into the kidney pelvis or ureter in a way to block the flow of urine. The pain radiates from the loin obliquely downward into the right iliac region, the front of the thigh, bladder or genital organs. Symptoms from renal stone depend upon the character and location rather than the size of the stone. The pain may appear suddenly and is of an agonizing character, associated with marked muscular rigidity or spasm. If the stone passes pain may suddenly cease, leaving the bladder more or less irritated. If the stone is rough, it may produce much irritation and hemorrhage. "If the ureter remains long blocked by a stone hydronephrosis marked by a tumor mass beneath the costal margin may be found. When suppuration occurs in connection with stone, pyonephrosis results and pus, blood, casts, and albumin may be found in the urine and septic symptoms may result."

The liver, when enlarged from hepatic abscess, may extend several inches below the rib border. When due to amebic or other infections, dull aching pains are present all over the abdomen. The pain is most active during the night or early morning. Indigestion, headache, lassitude, coated tongue, and a foul breath may be present. Loss of appetite, weight, yellow skin, and color may take place at times. Chills and rigors at times occur with pain and tenderness over the liver. If the abscess swelling is sufficient to only press on the bile radicles the jaundice is slight, but if the pressure is sufficient to obstruct the common or hepatic duct there will be marked jaundice.

Floating kidney pain of the right side is not so severe as that from renal stone and is localized in the right side of the abdomen. It is usually relieved by the patient lying on the back with head and pelvis elevated or on the right side with legs and thighs flexed upon the abdomen. Pain and discomfort are increased if the patient reclines on the opposite side. Severe exercise often gives rise to paroxysms of pain.

If the ureter is flexed or pressed upon by the descent of the kidney, pain will result. If a band of fascia or blood-vessel is abnormally located so as to drag across the ureter in the kidney descent, the patient may suffer pain in the loin which may be projected down along the ureter. When the attachments are loose enough to admit free mobility of the kidney, the ureter is not liable to kinking and the kidney remains symptomless.

A floating kidney may be found as a movable tumor anywhere from the costal margin to the pelvic brim. It is rarely tender, but when discovered by the patient it may cause great anxiety. It is not easily palpated in very corpulent or muscular subjects.

A good method for detecting a floating kidney is to have the patient's head elevated with the thighs flexed upon the abdomen and have a nurse turn the patient upon the unaffected side while at the same time the surgeon makes pressure under the rib border with one hand and with the other he palpates the abdomen. The kidney tumor may be made to pass up under the upper hand near the rib border. Another method consists in having the patient assume the back position with head and legs elevated, and take a deep inhalation, at the same time the side is grasped with the surgeon's left hand, while with the right hand he palpates the abdomen. In this way the tumor can be made to pass beneath the left hand.

Nephromata or hypernephromata (whether adenoma, papillary adenoma, cystadenoma, or papillary cystadenoma) cannot often be distinguished from floating kidney. With this tumor the kidney is usually tender to pressure but unaccompanied by pain. Nephromata may or may not be associated with sex abnormalities.

In appendicitis the pain in a large number of cases occurs at the epigastrium and then diffuses itself over the abdomen and generally localizes at or near McBurney's point. If the appendix is long enough to extend into the region of the gall-bladder and ducts, its inflammation may excite symptoms of cholecystitis or choledochitis and the pain may be at the rib border. If located behind the cecum, pain may be referred to the loin or the right rib margin. If in contact with the ureter, the pain may simulate that of renal stone. Regardless of its location, it is often the cause of gastrointestinal disturbances—pylorospasm, hyperchlorhydria and general intestinal irritation. Appendicitis is usually accompanied by temperature, high or low. In fact, in acute attacks elevation of temperature is the rule. I often doubt its existence when other symptoms are unaccompanied by fever.

Nausea and vomiting are usually present in most of these conditions but are not significant nor especially characteristic.

Jaundice is a valuable diagnostic sign. It appears in appendicitis and renal disease only as a result of sepsis.

Obstructive edema due to a duodenal ulcer near the ampulla of Vater sometimes results in closure of the common bile duct and may cause pancreatitis and jaundice.

Choledochitis and cholelithiasis are accompanied with slight or marked jaundice which may be of an intermittent or transient type. It may be so slight that an examination of the conjunctiva or a chemical examination of the urine is necessary to detect it. Pres-



sure by pyloric cancer upon the common duct may give rise to jaundice of a constant, progressing, intense type.

Peptic ulcers both of the stomach and duodenum are at times so infiltrated as to cause a tumor mass that may be felt in the median line or beneath the right rectus muscle which is, at times, very tender to touch.

Pyloric cancer produces a tumor that, at times, is freely movable upon full inspiration and separated from the costal margin by some depression. These cases are usually far advanced when the tumor is palpable—"firm, irregular, often painless, and not very tender to pressure."

When the gall-bladder is distended from obstruction to the cystic or common duct, it produces a pear-shaped tumor mass at the margin of the liver; movable synchronously with the diaphragm and unlike a pyloric cancer mass presents no depression between the rib margin and the tumor mass. It is usually more tender than floating kidney, pyloric cancer or infiltrated ulcer.

Appendiceal tumors may be located anywhere in the abdomen. The appendix is sometimes 6 or more inches long and may become attached to any other abdominal organ. When inflamed, it may become fixed by adhesions to some surrounding tissue. I recently operated on a girl eighteen years old with a left pelvic abscess. She had a pedunculated fibroid of the left side to which the appendix, 6 inches long, had become adherent, and had suppurated in the left side. On account of the various positions of appendiceal tumor masses confusion arises and errors in diagnosis may occur, as they often give symptoms common to the organ to which the appendix is attached.

Floating kidney tumors are usually marked by smooth, sharp outlines and mobility. They are usually free from pain and tenderness unless obstruction results from ureteral pressure.

A hydronephrotic or pyonephrotic kidney is usually stationary or fixed well back into the loin and does not move with the diaphragm. The hydronephrotic kidney usually presents no urinary findings, while the pyonephrotic kidney is usually accompanied by septic symptoms, the urine showing blood, pus, albumin and casts.

Pain is the most prominent symptom in all conditions of the upper right quadrant, and is of great value in a differential diagnosis, if the peculiarities and characteristics of pain common to each condition are kept in mind.

The pain of peptic ulcer has a definite relation to the intake of food; it is increased by the ingestion of large amounts of food and

lessened by small amounts. It is most severe between meals and at night. It is definitely localized in the epigastrium and frequently to the left.

Pain due to pancreatic calculus is usually paroxysmal and radiates to the back and along the left costal border.

Pain due to acute suppurative pancreatitis usually begins suddenly in the epigastrium, accompanied by nausea, vomiting, hic cough, chills, and irregular pyemic fever with great prostration.

Pain in hemorrhagic pancreatitis is sudden in onset, is deep-seated between the xiphoid and umbilicus, associated with severe nausea and vomiting, hiccough, constipation, and albuminuria frequently results if patient does not die in collapse.

Gall-bladder pain is most constant beneath the right costal margin and in the epigastrium, referred often to the right shoulder blade, down the arm and high up beneath the sternum. The pain is usually constant and paroxysmal and does not cross to the left as does gastric, pancreatic and appendiceal pain. If stone obstruction takes place, the pain may come on suddenly and frequently subsides suddenly, leaving the patient comfortable and well as if nothing had happened.

Liver abscess is accompanied by general abdominal pain, followed by localized pain and tenderness over the liver.

Renal stone pain is sudden in onset and is of an agonizing character, beginning in the loin and extending obliquely downward along the ureter to the bladder and thigh. If the obstruction is relieved, the pain suddenly subsides, leaving the patient as well as before, excepting at times a slight vesical irritation remains. Unlike gastric, pancreatic and appendiceal pain, it is never referred to the opposite side, and unlike gall-bladder pain it is never referred to the sternum, scapulæ and down the arm.

Hydronephrosis may present slight pain and tenderness on pressure. Pyonephrosis is very tender on pressure and often is accompanied by dull pain in the loin.

Appendiceal pain may come in paroxysms, severely or moderately colicky. It often appears in the epigastrium and localizes over McBurney's point. Wherever the position of a chronically inflamed appendix, pylorospasm and hyperchlorhydria may result, appendicitis pain may localize anywhere in the abdomen. If the inflamed appendix is located low in the pelvis, it resembles ovarian pain; if located far back under the rib margin, the pain is difficult to differentiate from kidney pain; if located at the liver border, the pain will simulate gall-bladder pain.

Regardless of every aid in diagnosis, it is often difficult to differentiate and, instead of waiting months or years for the trouble to clear up, an exploratory diagnosis under nitrous oxide gas-oxygen, or novocain should be made.

2031 AVE. G.

#### DISCUSSION.

DR. J. HENRY CARSTENS, Detroit.—We all recognize the difficulty in making a diagnosis in these cases. I read a paper the other day by a member of the Mayo staff, whose name I cannot recall, in which a report of their own work shows that they make over 10 per cent. mistakes in diagnoses. When we consider that patients pass through the hands of perhaps ten members of the Mayo staff and they make as many mistakes as that in diagnosis, what can be expected of us poor devils who are likely to make mistakes also, although we try to go through the same routine!

There are a few points in connection with this paper and subject that I want to bring out. There are more cases of trouble with the appendix, with symptoms in the right upper quadrant of the abdomen, in the region of the stomach and liver, than we have any idea of. Let us take, for instance, gall-stones, and what a difficult thing it is sometimes to make a diagnosis in a great many cases. They have no gall-stone colic, or very seldom do they have it. When a patient has occasional attacks of pain in the region of the stomach and liver, if that patient sleeps until 2 or 3 o'clock in the morning, when the stomach is absolutely empty, wakes up and has a severe pain in the region of the stomach, I make up my mind that he has trouble with the gall-bladder. These patients are very fleshy, and it is difficult to make an exact diagnosis of the condition which exists, and we should always advise, in a certain number of these cases, the making of an exploratory operation.

A valuable aid in the diagnosis of these cases is the use of the  $x$ -ray. If you have an  $x$ -ray apparatus, if there are gall-stones, and they contain a little over 3 per cent. of lime, you can see them with the  $x$ -ray. If they contain less than that, you cannot detect them with the  $x$ -ray, but with the  $x$ -ray and bismuth or barium, you can tell whether there is adhesion of the stomach, you can tell whether the pylorus is patulous; you can ascertain the position of the stomach and the intestines, and you can determine the condition of the appendix as a general rule. In a great many of these cases the trouble is in the appendix because that organ is malformed either congenitally or as the result of pelvic inflammation. In a great many cases it is postcecal, where you get no pain outside, and no rigidity of the muscle, and only by the deepest and hardest pressure can you find a sore spot, and if you press just as hard below and above you may strike with your finger a tender spot or a painful one. You press there to see if there is any trouble with the appendix.

I simply want to emphasize the point that we are not justified to-day in doing any operation, unless it be an acute case that requires it, until we get  $x$ -ray pictures of these cases.

DR. GORDON K. DICKINSON, Jersey City.—Even in the upper abdomen there is nothing orthodox. One has always felt that if you have obstruction of the common duct you are bound to have jaundice. I recall to my mind a case where there was a calculus impacted at the entrance of the duct into the duodenum. The common duct was as large as my index finger and distended with bile, so that it looked like a vein. On incising to remove the calculus an immense quantity of bile escaped and yet that patient did not have the least bit of jaundice.

I do not like diagnosing stones or calculi or operating for them. In the first place, if you do not find them, the people are very much disappointed; they want to see them because you have been talking about them and if you have not them to show they discount you. If you find three or four large stones that are making sufficient trouble to warrant operation and remove them, and some other doctor comes along and finds in another case a hundred or a hundred and fifty stones, he is regarded as the bigger surgeon.

DR. JAMES F. BALDWIN, Columbus, Ohio.—There is one point that was not brought out by Dr. Carstens relative to the matter of diagnosis in retrocecal appendicitis. In the vast majority of cases, when you have such a condition, you can by pressure elicit tenderness such as the doctor described; then tell the patient to keep the knee stiff and lift the right leg; as the psoas muscle contracts under your fingers, the tenderness becomes much more marked and the leg drops with an expression of pain from the patient. The appendix rests on the psoas muscle, and when brought up under the fingers gets pinched. I have made the diagnosis in this way over and over again, and have never failed to find a retrocecal appendix.

There is one town in Ohio where we are likely to find gall-stones in any patient who is sent for operation. We scarcely ever fail. A doctor from that town brought a patient to me with a large amount of pelvic trouble about a year ago. A careful examination of the abdomen failed to reveal any evidence of gall-bladder trouble. There was no stomach trouble, no pain, no tenderness, and I remarked that here was a case where we would not find any gall-stones. I did the pelvic work and then examined the gall-bladder, and there found what seemed to be one very large gall-stone. I removed the gall-bladder together with thirty or forty stones from the common duct. When I opened the gall-bladder after its removal it seemed as if a thick-walled gall-bladder containing a large number of stones had been filled with some fluid which had later become organized so that each stone was in a little pocket by itself, no two stones being in actual contact. When the gall-bladder was laid open and the stones removed, the inner surface of the bladder was very suggestive of the wax surface furnished by bee keepers to their bees for the building of comb.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—Permit me to relate a case in which the gall-bladder contained 1884 gall-stones. They gave rise to no symptoms. This patient sought my advice for the relief of an excessive procidentia. She was subjected to a high

amputation of the cervix, an anterior colporrhaphy and a posterior colporrhaphy and perineorrhaphy. The abdomen was then opened and a hysteropexy, bilateral oophorectomy and appendectomy performed. Before closing the abdomen her doctor said to me: "I wish you would examine the gall-bladder. Three years ago this patient had what I believed a gall-stone attack; but she had no similar symptoms since." An examination of the gall-bladder showed it was of considerable size. The median incision was closed; the gall-bladder exposed in the usual manner and its contents removed. We found 1884 stones of all shapes and sizes. When this patient's history was taken she did not even hint having symptoms indicative of biliary disease.

DR. JAMES E. DAVIS, Detroit.—The essayist did not speak of one condition that is very confusing, and that is a hernia occurring above the level of the umbilicus. These hernias have an obscure symptomatology frequently. In some instances the hernia is so small that it is almost impossible to make a diagnosis.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In reference to the paper of Dr. Davis, while I have no desire to decry the use of the *x*-ray, which he considers a most valuable aid to diagnosis, and which he employs constantly in suitable cases, I wish to emphasize the fact that even with the very best equipment and the most skilful operator the method cannot be considered infallible. I recall an illustrative incident which I witnessed a number of years ago in the London Clinic of Sir John Bland Sutton. The *x*-ray plates showed quite clearly seven stones in the right kidney. Upon this evidence, Sir John opened the kidney from pole to pole, but found no stone. Yet the *x*-ray pictures had been taken with the most up-to-date apparatus and by one of the most expert radiographers in London. Defects in the plates, accidents of one kind or another, calcareous deposits in the vicinity being photographed, are always to be reckoned with, as possible sources of error. In many instances the best interests of the patient are conserved by exploratory laparotomy rather than by waiting for *x*-ray plates or by depending upon them too greatly. They should be accepted as corroborative evidence or as adjuvant methods to supplement the clinical diagnosis.

DR. ALBERT GOLDSPOHN, Chicago.—With reference to the last speaker's experience about the kidney, I had almost identically the same experience. A patient was sent to a man whom I thought was the best *x*-ray man in our city, and he gave as his opinion that this is a kidney which contains calcareous material; it is an advanced tuberculous process, and there are very positive indications for operation. Acting on his opinion, when I cut in on that kidney I could not find anything the matter with it. I was perplexed, and studied for some minutes as to whether I should do anything further or not, or whether I should venture to remove it, which I did. There was no evil result and the patient's pain ceased. But I look at it merely as a matter of luck; and I might as well have gotten ignominy as credit.

In this matter of diagnosis in the abdomen, and particularly in

reference to epigastric phenomena, I cannot help but feel that I have been saved from some ignominious mistakes by admitting that the sympathetic nerve apparatus plays a hand in this game. I make mistakes, of course, as I also find some of the big men do. We must admit that there is a referred nerve influence or transmission of irritation from the pelvic organs to other parts in the abdomen or body.

In the early years of my practice in Chicago, Byron Robinson and I worked one winter together four evenings in the week, from eight to twelve o'clock, in the Post-Graduate Medical School, searching out these obscure sympathetic nerve ramifications in the body between the different organs and the several sympathetic plexuses. He was determined to find these lines of transmission, and he worked at it all the time. I shared with him the benefit of his work which matured in "The Abdominal Brain," that he published in later years.

How do we account for it that a child nursing at its mother's breast causes uterine contraction, if there is not a transmission of irritation or an impulse by way of the sympathetic nerve tract. You cannot say it is by way of the blood or lymph channels. Again, it is generally admitted that a chronic appendix is a source of irritation, and that it is a frequent cause of at least functional stomach disorder, if not of organic lesions there. Abnormal nerve impulses transmitted by way of the solar plexus seem to account for this much more rationally than to assume a constant stream of septic or toxic substance by way of the blood and lymph channels, and that this stream should be concentrated upon the stomach and not be disseminated to other parts of the body as well. Again, how otherwise than by sympathetic nerve transmission can we even imagine that some forms of dysmenorrhea have sometimes been promptly relieved by purely topical treatment of parts of the nasal mucous membrane. Many more instances that show the rôle of the sympathetic could be cited; nevertheless, many surgeons and internists persist in making fine spun diagnoses of gastric ulcers, etc., and even carcinoma of the stomach while ignoring the female pelvic organs entirely. And I have often seen these imaginary lesions promptly disappear after fulfilling a plain indication for gynecologic treatment.

DR. HUGO O. PANTZER, Indianapolis, Ind.—Greater refinement of diagnosis is the supreme effort in medicine at this time. I would here call attention briefly to the common neglect of properly cultivating our tactile sense, as is being done by the blind. Paradoxically stated we, the seeing, practice a "blind" touch when we palpate or percuss with a force which practically annuls tactile sensation. A light touch as practised by the cultivated touch of the blind enables a reading for diagnostic purposes that is little short of marvelous to the uninitiated; and the same is true as applied to palpatory percussion. Form, position, consistency, tenderness of abdominal organs can be made out with a precision that often equals the specific information derived from the x-ray. Indeed, in single instance it may rival it, for example: a noted x-ray specialist referred his female cook to me for vague abdominal disease. Notwith-

standing the muscular, youthful abdominal wall, I was able to map out by touch and palpatory percussion the evidence of a moderate stricture of the upper ascending colon, with marked tenderness upon acute pressure at the site of the stricture, and considerable dilatation, thickening and tenderness of the cecum and adjacent ileum. This diagnosis was all-satisfactory to me. However, it being available, I asked for an x-ray examination which was gladly granted. Report came back "no intestinal obstructive lesion anywhere." I ascertained that the ordinary test meal had been given and its course observed through the entire length of the alimentary tract. I requested a bismuth enema, which, in turn, became demonstrative of a definite constriction about the hepatic flexure. The subsequent operation verified fully this finding.

Considering that not one physician out of a hundred has made an effort to develop his tactile sense in this higher meaning, and regarding the importance of this matter, it would seem that our medical college curriculum shall include instruction for this particular development of the tactile sense.

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### EXCESSIVE DRAINAGE COMPLICATING SURGERY UPON THE COMMON BILE DUCT.\*

BY

J. E. SADLIER, M. D., F. A. C. S.,

Poughkeepsie, N. Y.

IN our usual routine work in surgery we are accustomed to the well-known difficulties and complications which surround us, and by full use of the knowledge which has been gained from personal experience and the teachings of others, we are enabled to exercise our best judgment to guide our patients by the possible complications incident to the condition from which they are suffering.

Quite different though—and much more startling—is it when, suddenly, there is drawn into our field of operative work some unforeseen complication, upon which there seems to be no definite knowledge, and in which no personal experience has been had. Such was my position with reference to the subject of this paper and the two cases which I will report.

During the past twenty years volumes have been written upon gall-bladder and gall duct surgery. The whole subject has been transformed and elucidated so that at the present time the surgery of gall-bladder and ducts is fairly clear-cut, and has ceased to give the anxiety it possessed in former years. Yet this somewhat new branch of surgery is not so far advanced, or so clearly defined, but what it is possible to meet with unexpected and unforeseen conditions, such as are presented in the following cases.

\* Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

CASE I.—F. M., married, aet. forty-seven. Referred by Dr. C. J. McCambridge. Hospital No. 1064. Operation, January 31, 1911. Family history negative, except that mother died of cancer. Personal history; negative as to gonorrhea and syphilis. Free from disease up to onset of present illness ten years ago.

Patient has been a confirmed alcoholic for thirty years, and especially so during the past three years. For the last ten years he has suffered from severe gall-stone colic, averaging an attack every four to six weeks, and of sufficient severity to necessitate anodynes.

The attacks were typical in character and were diagnosed by the attending physician. During intervals between attacks he suffered from hyperacidity, flatulency, belching and inability to take certain types of food. The attacks increased in severity, and for months prior to admission to the hospital he had chills and sweating at irregular intervals, prostration and decided loss of flesh. An icteroid hue to skin was present, and upon admission to the hospital he had the appearance of a decidedly sick man. He was very sensitive to palpation in region of gall-bladder.

At operation, the gall-bladder was found much thickened and contained forty-six stones. The common duct was greatly dilated and contained twenty-six stones, several of which were the size of hazelnuts. They were removed through incision of duct. It was noticed that the head of the pancreas was enlarged and thickened. All stones were removed and drainage was established to both gall-bladder and common duct. Patient rallied nicely from operation, but within a few hours it was noticed that the drainage was excessive and continued to increase in amount to such an extent that, by the third day following operation, he was discharging from 3000 to 5000 c.c. daily, of a very light amber-colored fluid, which was daily becoming lighter in color. After removal of the drainage tubes, on the sixth day, the fluid excoriated the skin so that it became necessary to protect it with ointments. Patient did well until the fifth day, when by reason of the dehydration consequent upon excessive drainage he went into a state of collapse, of serious proportions, so that for a time death seemed imminent. He was rallied by large quantities of saline solution given intravenously and subcutaneously.

During the next two weeks the excessive drainage continued and he was kept alive through the administration of salines, subcutaneously given, in sufficient amounts to overcome the dehydration incident to the drainage. During all of the time he was nauseated and unable to take fluids by mouth. Many times during this period of excessive drainage he was in imminent danger, with usual symptoms of collapse (almost imperceptible pulse, cold extremities, sweating skin, etc.), but could always be rallied by timely administration of salines.

The excessive drainage continued for eighteen days and then ceased rather abruptly. The patient recovered and has remained well to the present time, and is completely free from any gall-bladder symptoms.

At the time of this unusual sequence, it was considered to be due



to overactivity of liver cells incident to the intemperate and prolonged use of alcohol, and the associated pancreatitis was not considered.

The incident of excessive drainage from gall-duct surgery did not again present itself to me until April, 1916, when a similar experience was noted in the following case:

**CASE II.**—Edna C. H., aet. thirty-three, Millbrook, N. Y. Hospital No. 2122. Referred by Dr. H. D. Mackenzie. Married. Family history negative as to hereditary disease. Personal history free from syphilis, gonorrhea and alcoholism. She had never had any serious illness prior to onset of the present disease.

Admitted to the hospital on April 17, 1916, with a diagnosis of chronic cholecystitis and cholelithiasis, which had existed for nine years. During that time she had been subjected to severe gall-stone attacks, at intervals varying from a few days to several months. Of late, these attacks had occurred more frequently, and there was almost constant tenderness upon palpation under the right costal margin. There were the usual gastric symptoms, loss of flesh, chills, fever, sweating and slightly jaundiced hue to skin, indicating probable common duct involvement.

Operation, April 20, 1916, disclosed a much enlarged and thickened gall-bladder, which was filled with stones of varying size. Cholecystectomy was performed, but not until the greatly dilated common duct had been opened and from it had been removed sixty-one stones, some of which were as large as small cherries. It was with difficulty that the common and hepatic ducts were finally freed from stones. No palpable evidence of chronic pancreatitis was found. Drainage of common and hepatic ducts was instituted.

Patient rallied nicely from operation, but upon the day following it was noticed that there was more than a usual amount of biliary drainage, which steadily increased in amount, so that by the fourth day, subsequent to the operation, the amount was so excessive as to be alarming, and produced the usual symptoms to be seen when large quantities of fluid have been withdrawn from the body, such as very rapid and weak pulse, exhaustion and impending collapse. Patient was almost *in extremis* with cold sweating skin and ashen color, but was quickly rallied by timely administration of salines. The excessive drainage of a light amber-colored fluid, which seemed to well from the depths of the wound like a miniature fountain, continued for thirteen days and then gradually subsided.

During the period of excessive drainage she was continually in serious condition, but her death was prevented by the use of large amounts of saline solution, subcutaneously administered. She was nauseated all of the time and occasionally vomited so that her stomach could not be used. The drainage excoriated and digested the skin over a large area with which it came in contact and acted as though there was an admixture of pancreatic fluid in the outflow.

It is to be regretted that it was impossible to collect and measure the amount of fluid drained each day. The patient finally made a slow but satisfactory recovery.

The desperate condition in which these two patients had been placed, from a complication in gall-stone surgery, which to me was unusual and unknown, led me to make a search of the literature to ascertain if other surgeons had noted and reported upon such complication.

A careful perusal of articles, back to 1899, on gall-bladder and duct surgery, as recorded in the Index Medicus and Surgeon General's Catalogue, shows no report of such a complication. Foreign literature, with the exception of Kehr (*Die Praxis der Gallenwege-Chirurgie*), was not consulted.

In an endeavor to get the individual experience of others, a letter was sent to a large number of the surgeons in America, who are prominent as operators in this particular field of surgery, containing the following question: "Has excessive drainage to a point of dehydration ever occurred in any of your operative work upon the common bile duct?" As a result of this inquiry, I have obtained affirmative replies from eight surgeons who have had this complication occur in one or more cases. Several report fatalities, while others were fortunate in being able to overcome the weakening results of dehydration by the timely administration of salines. Hence, the outcome of this inquiry was somewhat astounding in the fact that here was a fairly frequent and serious complication of gall-duct surgery which had not, to the present date, been reported in our literature.

In substantiation of the assertion that this is one of the complications of common-duct surgery to be reckoned with, I beg to quote from the following personal communications received from my letters of inquiry among surgeons:

W. J. MAYO, M. D., Rochester, Minn.—"I have seen a number of cases such as you speak of in which there has been excessive drainage from the common duct, and we have usually concluded that a certain percentage of them were due to regurgitation of the pancreatic juices."

GEORGE W. CRILE, M. D., Cleveland, Ohio.—"I have had, at least, one striking example of an excess drainage to a point of dehydration in an operation upon the common bile duct."

ALBERT J. OCHSNER, M. D., Chicago, Ill.—"I have had a case in which excessive drainage to a point of dehydration has occurred in an operation on the common duct where there was a large stone impacted just at the entrance of the duct into the duodenum. I gave the patient nothing by mouth except the whites of two eggs

every four hours. I used a transfusion of 1000 c.c. of normal salt solution every night and morning and gave 1 ounce of liquid peptoids in 3 ounces of normal salt solution as a nourishing enema every four hours, and the condition disappeared in about ten days."

R. R. HUGGINS, M. D., Pittsburgh, Pa.—"In reply to your question concerning excessive drainage of the common bile duct, I beg to state that I have had several cases where the drainage was so great that for a time I was much exercised about the effect because the weakness incident to such a great loss of fluid seemed quite alarming."

PARKER SYMS, M. D., 361 Park Avenue, New York City.—"Last winter I operated on a lady who had gall-stones and cholecystitis; she also had a large liver. There was no evidence of pancreatitis, and there was no stone in the common duct. She had intermittent jaundice. I removed the stones and drained the gall-bladder. About a week after the operation she suddenly began excessive drainage, for two days she drained more than 120 ounces in each twenty-four hours. Then the drainage ceased as suddenly as it began."

G. K. DICKINSON, M. D., 280 Montgomery St., Jersey City.—"I have had in gall-duct work excessive drainage of the bile that blistered the skin, producing desquamation all around the margin, very difficult to keep from infection, where the patient ran down hill rapidly. Though I have had no means of testing them, I felt that the drainage was as much from the pancreas as from the common duct."

In analyzing the histories of the two cases herewith reported, we note certain points of similarity, namely, they both were long standing cases of common duct infection and incomplete obstruction; the latter was a result of the duct's being filled with gall-stones to such a degree that they must have constituted an impediment to the normal and usual outflow of bile and, resulting from the obstruction, we had in each case well-marked dilatation of the common duct. In only one case was there an alcoholic history and likewise in but one case was there involvement of the pancreas. Hence these two conditions can be eliminated as complete causative factors. They cannot be disregarded as partial influencing conditions in provoking the excessive drainage. I am unable to state the positive cause for this peculiar and serious complication, but I am disposed to believe that we have a condition somewhat analogous to that seen in the surgery of the hypertrophied prostate gland, where, as a result of incomplete emptying of the urinary bladder, we get back pressure upon the ureters and kidneys, which, when suddenly relieved through operative intervention, results in an excess outflow of urine of low specific gravity, which is a well-known source of danger in a person debilitated by long continuation of the preëxisting disease. Is it not quite probable that in partial obstruction to the outflow of the

bile, by reason of the common duct obstruction from stone, that we have a dilatation of the smaller biliary radicles in the liver? Increased back pressure, which, when suddenly relieved by operative removal of the obstruction, produces a condition of venous engorgement of the liver with resulting outflow of fluid which is more in the nature of a transudation than an actual biliary secretion, and this coupled with a back flow of pancreatic fluid through the dilated duct, would account for the excessive drainage. Yet I will not presume to definitely determine the causative factor, for the object of this paper is not to analyze the condition, but to suggest that in our operative work upon the common bile duct we must consider the possibility of excessive drainage and be prepared to combat it before the patient becomes dehydrated to the danger point.

295 MILL STREET.

#### DISCUSSION.

DR. LEWIS F. SMEAD, Toledo, Ohio.—I wish to report a case of this kind. Mrs. B. F., a widow, aged twenty-eight, mother of one child, entered the hospital complaining of pain in her upper abdomen and of jaundice. She had been well the greater part of her life except for numerous attacks of pain in the region of the gall-bladder. Several weeks previous to the present attack she was operated upon for double pyosalpinx, and when she entered the hospital for the gall-bladder trouble there was a free purulent discharge from a suprapubic drainage opening. Owing to this discharge and the recent operation, it did not seem wise to operate upon what seemed to be a recurrent attack of cholecystitis. After some days, however, the patient was no better, and it was evident from the patient's general condition that she would have to have relief. The suprapubic drainage had stopped in the meantime.

On July 12, 1916, the abdomen was opened and the common and hepatic ducts with the gall-bladder and cystic ducts were found greatly dilated and distended. The common duct was half an inch or more in diameter. The common and hepatic ducts from the ampulla of Vater to the liver stood out very prominently and felt like large thrombosed veins. The gall-bladder and ducts together contained 250 c.c. of a light green watery mucus. There were five or six gall-stones present. The diseased gall-bladder was removed and a drainage tube fixed in the stump of the cystic duct.

The drainage from the cystic duct following the operation was very large, and was accompanied by a great deal of vomiting. After the first few days the amount varied with the fluid retained. The drainage appeared to be blood serum slightly tinged with bile. The patient's tissue seemed to dry up and shrink with great rapidity. At the time of her operation she was in good flesh and in three days she was terribly emaciated.

The treatment consisted chiefly in keeping up the fluid intake.

Liquids by mouth were given as much as possible, and salt solution per rectum and under the skin.

The condition seemed to me to be an acute hydrops of the bile ducts extending from the ampulla of Vater to the smallest bile duct radicles. I am certain she had an acutely distended and palpable gall-bladder for at least a month before the operation.

When the drainage stopped the patient seemed to recover her flesh almost as rapidly as it was lost. At the present time, while she has gained her weight, yet the tissue is not firm and good, and the patient has not regained her strength. The bile drainage stopped and the bile appeared in the stools.

The following table is of interest in connection with this case:

July	Day No.	Drainage in	Temp.	Pulse	Resp.
12	1	24	100.0	140	18
13	2	76½	101.3	124	26
14	3	138	99.0	108	20
15	4	61½	99.3	120	28
16	5	49	98.2	126	18
17	6	40½	98.0	108	16
18	7	51	99.0	116	24
19	8	50	98.0	124	24
20	9	20	98.2	112	24
21	10	45	98.0	120	24
22	11	23	97.2	120	22
23	12	19	98.0	116	24
24	13	10	97.3	104	18
25	14	29	99.1	106	18
26	15	51	98.0	128	24

Tube out and dressing saturated.

I would like to emphasize one or two things in this case. In the first place, the pancreas was very hard. There was very little excoriation of the skin, no more than there would be from ordinary bile drainage, but I was impressed by the fact that there had been an acute distention of this gall duct which was very noticeable at the time. We know that the bile ducts become dilated and hypertrophied from chronic obstruction without destroying liver functions, but what do we know about the effect of acute dilatation and back pressure up into the liver? It is different in the kidney, and it may be that it is different in these cases.

DR. GORDON K. DICKINSON, Jersey City.—I have numerous cases of that kind that are bothersome to me, to the patients and to the nurses. I have an opinion, not a theory, simply a hypothesis, and that is, the pancreas is, you might say, anaphylactic to the bile backed into it, and brings about pancreatitis, so that anatomically between the bile and pancreatic ducts we have a flow of pancreatic juice into the ducts of the liver. We may have just this effect produced. The

conditions existing macroscopically are not only a dermatitis digesting the epithelia on the surface around the orifice, but nonhealing of the wound. The fat is absorbed; the wound tends to gape, and it is with difficulty we are enabled to keep the wound from opening down to the peritoneal cavity. I have found a little trick which helps in these cases, and I am laughed at a good deal by my professional brethren for speaking of it, and that is, Fleishman's yeast cake. Keep the surfaces covered with yeast. The pancreatic juice does not get at the tissues and is negatived largely by it.

DR. EMERY MARVEL, Atlantic City, New Jersey.—The importance of this subject seems very evident. When a patient has undergone a serious operation we consider it good judgment to instill fluid into the circulation. If that patient is losing daily 300 centimeters of fluid, how much more important it is that that fluid should be compensated for, as well as to supply additional demand.

According to the title of Dr. Sadlier's paper, the discussion should be limited to drainage of the common duct, but in discussing it I think we might with profit extend the consideration to drainage of all bile ducts. This loss of fluid is the same and it is equally important whether drainage comes from the common duct, the hepatic duct, or from the cystic duct. The doctor gives as a remedy for this condition, first, compensating fluid; second, supply of salines. I would like to add one other excellent remedy, and that is glucose.

In the drainage of the gall-ducts, or any drainage from the liver there is a loss of the sugar element. An instance came recently to my mind of a patient who showed a clinical condition such as this: Extreme prostration; a large amount of drainage, with low arterial tension, which naturally goes with loss of fluid; delirium; and extreme apprehension. Instillation of fluid in the veins helped; saline helped; but the greatest amount of good came when the stomach was washed and then filled with a solution of glucose.

The younger Gerster has called attention recently to the necessity for bile, and reports a case in which the common duct drainage of bile was extreme. He recovered the bile from the common duct drainage, and introduced it into the stomach by the stomach tube. He felt he had saved the patient's life by giving him this great quantity of bile. I would urge the importance of adding glucose as one of the remedies to be used.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—Some years ago Mr. Charles Waugh, of the great Ormond Street Hospital, London, began to use with excellent results the plan of hydrating the patient previous to operation in severe cases where shock or other serious tax on the patient's vitality can be anticipated. I have employed the method with great satisfaction. A few days before operation the patient is given by mouth, after clearing out the bowels, glucose solution or dextrose water. Immediately after the operation glucose or dextrose water, with or without bicarbonate of soda, 1 dram to a pint, is introduced into the bowel by the Murphy drip, giving 40 drops per minute continuously until gas is passed, then half the time until the fluid is expelled,

or until the urine is sufficient in quantity, and all signs of shock have disappeared.

DR. SIGMAR STARK, Cincinnati.—While I have never met with these extreme cases of excessive discharge from the gall-bladder or bile ducts after operation for gall-stones, I have met with some in which there was quite a profuse discharge of a light amber-colored fluid as was described by the essayist. The explanation I have to offer for this condition is somewhat different from that of the essayist, and is in conformity with the opinion of Dr. Martin Fisher, physiologist in the Department of Medicine of the University of Cincinnati, namely, that it is the product of the epithelium of the gall-bladder. You will recollect that in the two cases described, in the first one there was a cholecystostomy, and that in place of bile there was this excessive discharge from the gall-bladder, and in the other case the same kind of discharge took place from the common duct drain. To my notion this is similar in character to the gastrosuccorhea that we meet with in pyloric obstruction. There is an inflammatory swelling of the mucosa of the gall-bladder and cystic duct with occlusion of the latter in the one instance and a similar condition of the common duct mucosa in the other. This is in line with the experience I had in the treatment of these cases. For a day or two after draining the gall-bladder we would have a free discharge of bile, and then there would be very little of it, and after another twenty-four or forty-eight hours there would be none at all. The drainage tube in the gall-bladder intensifies the inflammation of the gall-bladder to such an extent that you finally have a complete obstruction of the opening of the cystic duct and then this copious amber-colored fluid appears together with a lot of tenacious mucus. To cope with this additional inflammation, I washed out the gall-bladder with normal salt solution, injected sterile olive oil, but apparently added to the disturbance. I was between the devil and the deep sea. I would take out the drainage tube, and after a day or two get a discharge of bile again, then when I reintroduced it there would be a recurrence of the same phenomena. To overcome this Dr. Fisher advised me to irrigate the gall-bladder with a 2½ per cent. solution of sulphate of magnesia with the idea of dehydrating the edematous mucosa. After thoroughly cleansing the viscus, the cavity was filled with the solution and the drainage tube clamped for about one-half hour. This procedure has given me excellent results in such cases. I am using it in a case like this just now. We prepare a 5 per cent. solution of sulphate of magnesia and dilute it with an equal quantity of hot water to get the proper temperature, and we inject it into the gall-bladder once or twice daily; usually after a couple of days the patency of the cystic duct becomes reestablished, you get a flow of bile and are made happy. I have in one case added the internal administration of urotropin to this procedure, and whether it added to the efficacy of the treatment, I am not prepared to say.

DR. GEORGE A. PECK, New Rochelle, New York.—I cannot add anything of value to the discussion of this paper except to call atten-

tion to another remedy to prevent excoriation from the pancreatic discharges as they occur in stomata of the upper intestines and in those gall-bladder cases where there is regurgitation of the pancreatic fluid, and that is the employment of MacDonald's skin varnish. MacDonald has devised a skin varnish as a substitute for rubber gloves. Last winter I had to treat a case in which there was a discharge of pancreatic fluid which caused digestion of the skin of the abdomen. MacDonald makes a varnish for this purpose extra heavy, and you may apply it once daily. In this instance I secured a healing of the skin inside of a week. If you have not already used it, I would call your attention to it and ask you to try it.

DR. ELBRECHT.—I would like to ask Dr. Peck what the composition of it is.

DR. PECK.—I do not know the exact formula. It is essentially a gutta percha preparation which is combined with different oils which prevent it from cracking. It is elastic, it sticks to the skin and can be removed only by the use of acetone. But in these cases of excoriation with digestion of the skin you will not find it necessary to use acetone. The action of the digestive fluids is sufficient to cause it to crack and peel off and you can rub it away quite readily at the subsequent dressing.

DR. SADLER (closing).—I am deeply obliged to the gentlemen who have so carefully and thoroughly discussed my paper. With reference to the discussion of Dr. Stark, I think perhaps he misunderstood me—or, at least, I may not have made clear the fact that my first case occurred some five years ago, when gall-bladders were not being removed as frequently as they are at the present time. In that case, I opened the gall-bladder and removed the stones from it, and later found it was necessary to open the common duct. Hence, drainage was established to both the common duct and the gall-bladder.

Following the operation, the greater amount of excessive drainage came from the tube located in the common duct. Of course, after the tubes were removed on the sixth day, we no longer knew from whence most of the drainage came.

In the second case a cholecystectomy was performed and drainage was entirely from the common duct.

In the case reported in the paper by Doctor Syms of New York drainage was directly from the gall-bladder.

I appreciate very much the theory which Dr. Stark has brought forth, as emanating from Doctor Fisher, but we have not been in the habit of believing that the gall-bladder was a secreting organ.

*(To be continued.)*



## THREE CASES OF SUCCESSFUL REPAIR OF VESICAL FISTULÆ FOLLOWING OPERATIONS.\*

BY

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New York City.

(With four illustrations.)

IN the earlier years of practice, I had the opportunity of seeing many cases of vesicovaginal fistulæ while assistant to Dr. T. A. Emmet at the Woman's Hospital. These were all the result of complications of labor and I do not remember to have seen a case of fistula resulting as a complication of operation. The creation of an artificial fistula for the purpose of drainage of the bladder in chronic cystitis was a procedure of not infrequent occurrence. These fistulæ were left to drain from six months to a year, until the bladder had attained a healthy condition and were then closed. Of recent years the fistulæ due to complications of labor have been seen much less frequently, but fistulæ of the bladder or ureter as a result of operations have become comparatively common.

The disappointment of a woman who has an operation chiefly for the reason that it is advised and not on account of suffering, who leaves the hospital with a fistula is very great, there is a corresponding feeling of gratitude for relief.

I report these cases not so much for the interest attached to the common factor of vesical fistula which serves to group them, but chiefly for other factors which made each case one of considerable interest.

CASE I.—Mrs. C., Jamaica, W. I., aged forty-five, multipara, referred by Dr. Vining, Jamaica, W. I. Entered Post-Graduate Hospital, September 23, 1907. Six years before had a complete hysterectomy for uterine fibroid. Ever since that time all urine has passed by the vagina without control. General physical examination negative, except for a small movable tumor of the right breast. Examination of the pelvis shows absence of uterus and adnexæ, and the finger enters the bladder at the top of the vagina through a fistula extending about 1 inch in a direction transverse to the long axis of the vagina. Inspection of the vaginal vault (Fig. 1) shows a transverse fistula with deep reddish growth hanging down like an apron from the posterior border of the fistula into the vagina. Diagnosis, vesicovaginal fistula with papillomatous growth from the posterior margin of the fistula.

\*Read before the Section on Obstetrics and Gynecology of the New York Academy of Medicine, October 24, 1916.

Operation September 25, 1907. Patient in lithotomy position and under ether narcosis. The growth on the posterior margin of the fistula was cut away with thermocautery. The right breast was then prepared for operation and a small tumor, apparently benign was removed, wound closed with catgut.

October 15, 1907. Operation for closure of fistula into bladder. Patient in the lithotomy position and under ether narcosis. Four tension sutures were passed into the vaginal wall about  $\frac{1}{2}$  inch

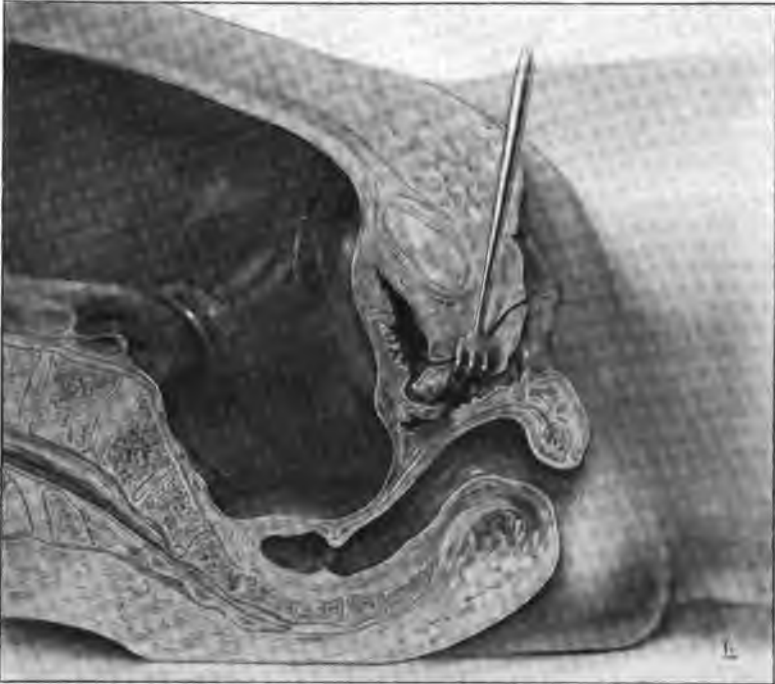


FIG. 1.—Vesico-vaginal fistula with growth on the posterior wall of the fistula extending into the vagina.

anterior and posterior to the ends of the fistula, tension on these sutures brought the fistula into an easily accessible position. The edges of the fistula were denuded and six No. 28 silver wire sutures were passed so as to close the fistula. A self-retaining rubber catheter was introduced. The catheter was changed every second day and the stitches were removed on the tenth day.

The patient left the hospital cured on November 4th.

Pathological report by Dr. H. T. Brooks of the specimens removed is as follows:

"Microscopic examination of the breast tumor removed by you from Mrs. C., showed the histologic features of intracanalicular adenofibroma. It is nonmalignant.

Microscopic examination of the "growth from vaginal wall" showed the structure of angioma with a small number of mucous glands. I was unable to find any signs of malignancy in the sections."

On May 20, 1916, Dr. Vining reports Mrs. C. in excellent health with no return of growth and with perfect bladder function.

CASE II.—Mrs. T., aged fifty-five, married seven years, nullipara. Referred by Dr. Krauss. Entered Post-Graduate Hospital, November 9, 1914.

*Previous History.*—Had always been well until present illness. Present illness began about September, 1913, to have blood in the



FIG. 2.—Pedunculated carcinomatous growth of the bladder with fibromyoma of the left broad ligament.

urine of bright red color; gradually began to have a feeling of pressure in the region of the bladder with frequent attacks of bladder tenesmus, sometimes passing small blood clots in the urine. Pain, pressure, hemorrhage, and inability to empty the bladder increased until it became unbearable, when she entered the hospital for relief.

General examination negative. Patient anemic, but well nourished, weighed about 175 pounds. Pelvic examination showed a soft boggy mass occupying the region of the bladder and a hard lobulated mass extending off from the side of the uterus in the left broad

ligament. A preliminary diagnosis was made of carcinoma of the bladder with extensive metastasis into the broad ligament.

The day after entering the hospital a cystoscopic examination was made by Dr. Terry, then my assistant. He made a diagnosis of carcinoma involving the fundus and distending the bladder. A papillomatous mass infiltrated with blood clots could be seen (Fig. 2). The patient was placed in the Sim's position and an artificial vesicovaginal fistula after the method of Emmet was made. This was done to drain the bladder and relieve the intense suffering, in which it was successful.

At the time I did not feel that further operation was worth while on account of the assumed extensive cancerous growth in the broad

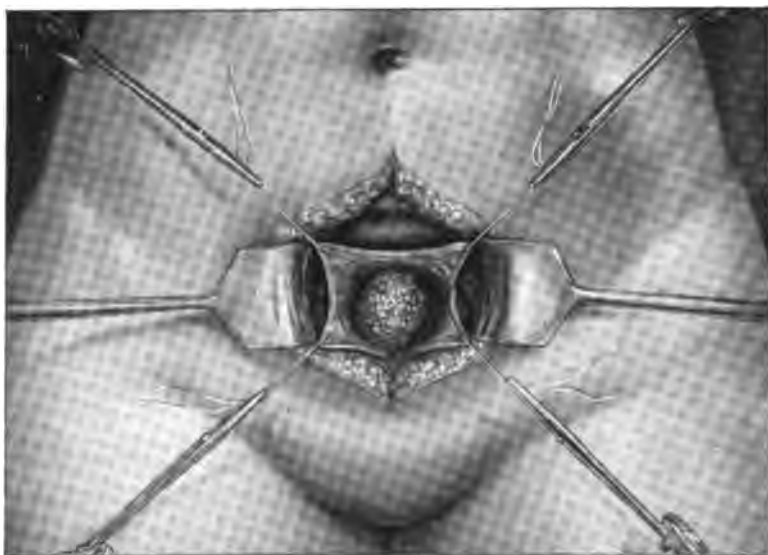


FIG. 3.

ligament. About two weeks later the condition was explained to the patient and an extremely bad prognosis as to the outcome of further operation was given. Operation for removal of the growth was advised, but left to the patient to decide. She decided on operation.

Operation on December 1, 1914. Under ether narcosis a median incision was made extending two-thirds of the way from the pubes to the umbilicus. The patient was placed in extreme Trendelenburg position and the intestines well walled off with gauze pads. The lobulated mass in the left broad ligament gave the appearance of intraligamentary fibromyoma not connected with the uterus. The peritoneum was incised over it and it was shelled out. The vesico-uterine fold of the peritoneum was then incised and the bladder dissected from the uterus, the incision in the peritoneum extending

well away toward the sides to give mobility to the bladder. Four tension sutures (Fig. 3) were passed in the fundus of the bladder and it was incised in an anteroposterior direction for about  $2\frac{1}{2}$  inches. With tension on the traction sutures this gave a good view into the bladder. The bladder was seen to be occupied by a papillomatous mass, more or less infiltrated with clotted blood. It was seized and with very little tension, part of the mass broke away; upon seizing the remainder and making moderate traction upon it, it was evident that the whole mass sprang from a pedicle which had its origin at the base of the bladder between the two ureters. Under tension a catgut suture was passed through the pedicle at its base and it was tied off. The pedicle was then cut away with the thermocautery. The pedicle seemed to retract into the tissues of the bladder. There was no appearance of infiltration in any part of the bladder and no evidence of malignant growth anywhere else. The incision in the bladder was closed with a double row of catgut sutures. The peritoneum was again attached to the uterus in the normal situation and the abdominal wound was closed by the usual layer method without drainage. No catheter was used as I decided to leave the artificial vesicovaginal fistula open until I should have seen the outcome of the operation.

The patient made an uneventful recovery from this operation.

In the early part of May, 1915, an examination at my office showed that apparently there was no return of the growth, there being no bleeding or other symptoms. So it was decided to close the artificial fistula. This was done by the method of Syms with silver wire. A self-retaining rubber catheter was introduced and changed from time to time. After about six days she appeared to hold the water and pass it around the catheter. Therefore it was dispensed with, the fistula united by first intention and the sutures were removed.

The function of this patient's bladder has been perfectly restored and thus far there has been no symptom of a return of the growth, an occurrence which we well might expect in view of the pathological report which follows:

Pathological report No. 84, Mrs. J. T., Dec. 1, 1914.

*Nature of Specimen.*—Carcinoma of bladder.

*Gross.*—Two light red pieces of tissue of papillary structure; larger is 3.5 cm. in diameter and the smaller is 2 cm. in diameter; both soft and friable. The larger is tied off around a pedicle which is 7 mm. in diameter.

*Microscopic.*—Shows heavy columns of a typical epithelium supported by thin bands of branching stroma. At the base of the tumor the epithelial cells dip inward and infiltrate downward into the smooth muscle of the bladder wall. There is a moderate inflammatory reaction manifested by the presence of plasma cells and some polynuclears in the stroma and around the base. The not infrequent presence of dividing cells indicate a moderately rapid proliferation.

*Diagnosis.*—Papillary adenocarcinoma accompanied by a mild inflammatory reaction.

Pathological report No. 84, Part 2.

*Nature of Specimen.*—Fibroid of broad ligament.

*Gross.*—Smooth, rounded mass presenting lobulated elevations on the surface; measures 10 by 7.5 by 5.5 cm., light pink in color, moderately firm in consistency; on section is firm and shows structure of fibroid.

*Microscopic.*—Microscopically the tumor is made up of dense bundles of smooth muscle with a small amount of interlacing connective tissue.

*Diagnosis.*—Myofibroma.

CASE III.—Mrs. S. W., aged thirty-two, married fifteen years, para-iv, consulted me April 17, 1916. General examination negative.

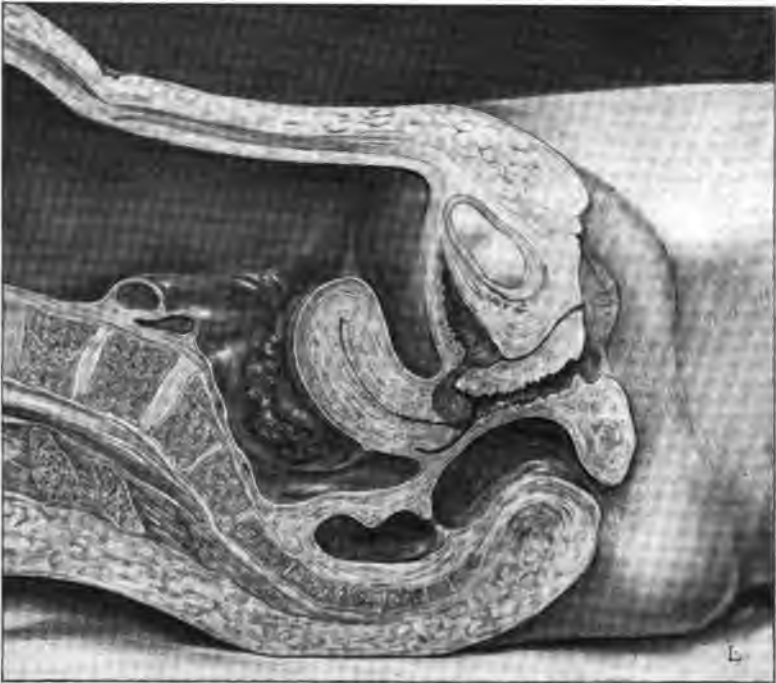


FIG. 4.—Vesico-vaginal uterine fistula following vaginal Cesarean section.

Body well nourished. Menstrual history negative. Complaints of having no control of the bladder, the urine dripping away constantly. This dates from a vaginal Cesarean section for placenta previa performed at the German Hospital in February, 1916.

Pelvic examination shows an extensive laceration of the perineum, laceration and erosion of the cervix and urine trickling from the cervix (Fig. 4). No fistula could be seen in the bladder wall.

She was operated upon by Dr. Ward at the Post-Graduate Hospital, May 2, 1911. At that time the diagnosis was: endometritis, left salpingitis, cystic right ovary, varicosity of right pampiniform plexus, and retroversion of the uterus.

The following operations were performed for these conditions on May 3, 1911: Curettage, left salpingectomy, ligation of right pampiniform plexus, resection of part of right ovary, Gilliam's operation for retroversion and repair of ventral hernia.

The patient has borne two full-term children since and had one pregnancy in which there was placenta previa and for which the vaginal Caesarean section was done which was followed by the cervicovagino-vesical fistula.

This patient was admitted to my service at the Post-Graduate Hospital on May 7, 1916, and was operated on May 8, under ether narcosis. Examination showed a fistula from the bladder into the cervix and vagina so high as to seem inaccessible from the vagina. To overcome this the vaginal mucous membrane was divided all the way around the cervix, as if for a vaginal hysterectomy. The bladder was separated from the anterior part of the cervix. With the use of two tension sutures, the fistula was readily drawn into sight and after a suitable denudation was closed with silver wire sutures. The vaginal mucous membrane of the vault was again sewed to the cervix and a self-retaining catheter introduced into the bladder.

The patient made an uneventful recovery and left the hospital on the twelfth day with her bladder perfectly performing its function. The cervix and perineum should be repaired.

At the last meeting of the New York Obstetrical Society, the subject of cutting ureters in operation came under discussion and I felt rather surprised at the fatalistic tone of the discussion. In my opinion, one should never cut the ureter or open the bladder by accident, as both are preventable. I have never yet accidentally cut a ureter, but have a few times opened the bladder by accident. But the bladder has always been immediately repaired, and I have never had a permanent fistula from this accident. I believe that in similar cases to those in which I have accidentally cut the bladder, that I would not do so again, except one. In this case the bladder was so far displaced upward, that notwithstanding the peritoneum was first incised just below the umbilicus, it was cut into. Greater care should be used to avoid cutting the ureters. There are conditions in which we may reasonably expect the ureter to be within the field of operation and in danger of being cut, and in such cases we should take the necessary precautions to prevent this accident. I have seen four ureters cut. Two were in cases of intraligamentary tumors. These tumors are very apt to have the ureters passing over them and in all large intraligamentary growths, especially cysts and in other subperitoneal growths in the lower abdomen and pelvis, especial caution should be used to avoid injury to the ureter.

## PELVIC VARICOCELE.\*

BY

H. DAWSON FURNISS, M. D., F. A. C. S.,  
New York City.

PELVIC varicocele in women is a condition not often recognized, but I believe is of equal if not more importance than scrotal varicocele. The reason for this is apparent as the objective findings in women are at the best only suggestive. In revising the literature I find in the Surgeon General's Catalogue only a very few references to varicocele in women, which is in marked contrast to the great number in men.

A. Palmer Dudley wrote one of the first important articles on the subject, and most of what he said holds true in the present state of our knowledge. In recent years Darnall and also Pinkham have called attention to the subject and to the possibility of its preoperative diagnosis. This preoperative diagnosis, made mainly on the proper interpretation of the history, familiarity with the condition and its attendant symptoms, will in time, I believe enable the majority of us to diagnose the condition with the same percentage of correctness as exists in other diseases. The majority of cases of ectopic are diagnosed on the history much more often than on the physical findings.

In this paper only the form of varicocele that exists more or less as an entity and not that due to pressure of the pregnant uterus, ovarian cysts, fibroids, or to the passive congestion of cardiovascular disease, will be considered.

The veins that are affected principally are those that form the pampiniform plexus and the branches into which they drain.

The ovarian veins arise at the hilum of the ovary, where they number about twenty. In the folds of the broad ligament they form a network, with free anastomosis, and they anastomose also with the veins of the uterine cornua. They run in the broad ligament parallel to the Fallopian tube, receiving blood from it and the round ligament, converge into two branches and finally into one and leave the broad ligament with the ovarian artery. Their further course is similar to the spermatic vein in the male. On the right the vein empties into the inferior vena cava at an oblique angle and is protected with a pair of valves. The left ovarian vein

\* Read before the Section on Obstetrics and Gynecology of the New York Academy of Medicine, October 24, 1916.



passes under the sigmoid and to the left renal vein, emptying into it at right angles without valve protection.

*Etiology.*—The fact that the majority of the cases follow repeated births makes it evident that pregnancy is a strong etiological factor. During pregnancy the veins become enormously dilated, and unless postpartum involution is good they do not return to their former size. Loss of pelvic support, malposition, especially retroversion, and infection play their part, the importance being in the order given. To these may be added loss of tone of the abdominal muscles, with a consequent disturbance of intraabdominal pressure. I believe, also, that any condition that causes loss of fat is an extremely important factor in the production of this condition.

Pelvic varicocele is so frequently found in association with general ptosis that one cannot help but regard it as a part of the same.

Tight lacing has been given a place in etiology, but I do not believe it important unless there are other associated causes.

My impression is that the chief factors are general lack of tone, loss of pelvic support, uterine subinvolution, retroversion and loss of fat, with possibly vein infection. Constipation is credited as a strong factor, the overloaded sigmoid pressing on the ovarian vein.

Reasoning from the anatomy one might expect that the venous circulation would be easily unbalanced, as the veins are long, ascend, and are not protected, or are inadequately protected by valves. Also, one would expect that on the left side the engorgement would be greater, as the left renal vein passes under the sigmoid, is longer and empties into the left renal vein without valve protection. At operation I have seen the right vein larger than the left, and it was noticeable as I had naturally looked for the left to be the larger, reasoning from the above and from the teachings of others. As far as I could determine the most feasible explanation for this is that the very structure which was supposed to be a causative factor, namely the sigmoid, offered better venous support as the vessels passed through its attachments. Further observations will be necessary to determine if this explanation has any value.

*Clinical History and Symptoms.*—The condition is usually seen in multiparous women, though at times in primiparæ and virgins. It is often encountered in those with torn or relaxed pelvic outlets. The thin woman with poor muscles is more prone to varicocele than the one who has strong muscles and a good quantity of fat. Many have in addition enteroptosis and nephroptosis; in fact the pelvic varicocele is one of the accompanying conditions. The most frequent symptom is that of pelvic pain, either a dull dragging pain or one that is bearing down. The pain is worse after long

standing or overwork, and is relieved by rest and lying down. In working women it is noticeably better the day of the week following the non-working day. But the characteristic of the condition is the prompt relief which follows assuming the recumbent posture. The pain of inflammatory adnexal conditions does not so promptly and regularly become lessened. The relief of pain after proper vaginal tamponade, and its recurrence almost immediately after the removal of the packing is extremely suggestive of varicocele. In some cases there is leukorrhea and in a few a prolongation of the menstrual period.

Many of these women are of the ptotic class and are naturally neurotic. I believe, however, that some normal women become neurotic as a result of this condition and that in the natural neurotics the condition is greatly intensified. This neurosis may be the result of constant nagging pain or may result from some disturbance of the ovarian internal secretion as a consequence of ovarian congestion and edema.

*Diagnosis.*—The diagnosis depends chiefly upon indirect objective signs and subjective symptoms. Given a woman of poor muscular development, who has enteroptosis, nephroptosis, who through childbirth has suffered a pelvic laceration, who complains of lower pelvic pain of a dull dragging or bearing-down character when up and around, and who is relieved of this by lying down, I would not hesitate to make a diagnosis of pelvic varicocele. I have felt the indefinite sense of resistance in the lateral fornix that disappears on pressure, but I have not been able to determine the worm-like mass that has been claimed to have been felt by rectal examination.

The greater the number of the above points present the easier it is to make a positive diagnosis. Even in well-developed individuals without pelvic floor lacerations the history of the pain that exists when upright, that disappears when prone, is suggestive but not convincing. A point of great diagnostic importance is that in patients treated with tampons who have this condition, the pain is better while the tampon is in, but that it returns almost immediately after its removal. In a number of the cases that I have had the diagnosis has been made before operation and posted on the operating sheet. In some the operation was for this condition alone.

In pelvic varicocele much can be done for the patient in the way of conservative treatment. They are materially benefited by gymnastic exercises that develop the general muscular tone of the body, especially that of the abdominal muscles. If thin they should be put on a fattening diet, for frequently after a gain of from 10 to

15 pounds, the patients feel much better and are occasionally entirely relieved of their symptoms. Hot douches, the assumption of the knee-chest posture at night, to allow the pelvic veins to empty, sleeping with the foot of the bed elevated and corseting to support the abdominal wall often helps. Hot douches and wool tampons sometimes give relief. These measures should be tried for a sufficient time before the patient comes to operation.

*Operation.*—Numerous methods of operation have been advocated, including multiple ligation with or without division of the veins between. Crossen and Sencert have advocated ligation at either end of the broad ligament, excision of the veins between, and peritonization afterward. All of the above has to be done with great care as it is most easy to puncture accidentally a thin wall vein that is apt to give rise to troublesome bleeding, or speedily develop a hematoma. I know of two cases of postoperative hemorrhage, one fatal, following the multiple ligation and division operation.

The operation that I have practised is either simple or double ligation of the ovarian veins at the pelvic brim. This is easier and safer and just as effective. I have had occasion to operate the second time on two of the cases. In each the former condition had disappeared and the ovarian veins were represented as thin white fibrous cords. One of the patients had a right salpingitis which had no relation to the operation. The other had a cystic ovary the size of a lemon. At the first operation the ovary was normal. Symptoms referable to the cystic ovary developed four months after the operation. I believe that possibly the disturbance of the circulation had more than a casual relation to the cyst development, and that such possibilities have to be considered in treating these cases. Repair of pelvic floor, injuries and corrections of malpositions are essential to success and relief of symptoms, and if not done it leaves present one of the etiological factor in the varicocele.

*Results.*—All patients have been more or less relieved, some completely and others only partially. I believe that the operation has a distinct place, but we cannot expect too much of it when we consider that it is often only one of the many lesions present in a neurotic individual. Aside from the patient who developed a cyst, I have seen no ill effects from the operation, and more than enough good to advocate it either as the sole operation or in conjunction with others. I think that the condition should always be in one's mind and that one should not close an abdomen when this condition exists without giving it the proper attention.

45 EAST SIXTY-SECOND STREET.

## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON OBSTETRICS AND GYNECOLOGY.

*Stated Meeting, October 24, 1916.*

GEORGE W. KOSMAK, M. D., *in the Chair.*

DR. JAMES N. WEST read a paper entitled

THREE CASES OF REPAIR OF VESICAL FISTULA OCCURRING IN CONNECTION WITH PELVIC OPERATIONS.\*

#### DISCUSSION.

DR. HERMANN J. BOLDT said: These are all interesting cases and I want to congratulate Dr. West on having been so fortunate as never to have accidentally cut a ureter. This is an unusual experience for a man who is doing much abdominal work. I must confess that I have cut both ureters within a year.

As to injuries to the bladder, if one discovers it at the time of the operation, it can be remedied easily. I have a patient in the hospital at the present time in whom I found that I had cut the bladder at the time of operation. This accident is most likely to occur when one is doing an operation for cancer and one should be on the look-out for it and correct it at the time.

A feature in the technic of these operations is not to put the sutures in too closely together. We have found that it is not desirable to put them in so closely together as was formerly done. I do a flap-splitting instead of the denudation operation, but if one does denude he should do an extensive denudation.

I have been pleased to hear that Dr. West uses silver wire; this makes a much prettier suture than catgut and silk, although I have formed the habit of using catgut or silk because they are easier to put in and less trouble to remove. I would like to congratulate Dr. West on his operation in the case of malignant disease of the bladder.

DR. EDWARD W. PINKHAM said: Dr. West is to be congratulated on 100 per cent. successful results. We all know that Dr. West learned his technic under a master and he is now a master himself. The repair of a vesical fistula is one of the most difficult of the plastic operations and I doubt if many can claim 100 per cent. successes in a series of over two cases. We do not see so many of these fistulae resulting from the traumatism of labor as we formerly saw, but we do see them as the result of radical operations for cancer.

I have operated on three cases of postoperative vesical fistula

\* For original article see page 145.

during the past year with  $66\frac{2}{3}$  per cent. successes. I have had quite a number of these cases during the past ten years and this percentage is fairly representative of my results. Many of these fistulæ do not result from cutting the bladder during operation, but to sloughing of the bladder wall after the operation. They may also be due to sacrificing the bladder wall when operating for cancer. Most of my evil results have been due to too close dissection of the peritoneum from the ureters, and a fistula from that cause is, as a rule, more difficult to repair than an ordinary fistula. Even with the best technic it is difficult to be sure that the tissues we are sewing are good healthy tissues that will hold together.

There are two important points to be borne in mind regarding the repair of these fistulæ. The first is the time of doing the operation and the second is the condition of the bladder and urine and the general condition of the patient.

I agree with Dr. Boldt that we formerly put our sutures too close together. This was a bad habit for the reason that we already have a very poor circulation in an impoverished area and close suturing still further interferes with the blood supply to the area. Silver wires, although the ideal suture, are very difficult to remove and the higher up they are placed the more difficult becomes their removal.

DR. WEST, in closing the discussion, said: You have been extremely kind in your discussion, but then I suppose you had to be in view of the fact that all these women are perfectly well. I presented the report of these cases because I wished to call attention to the fact that two of them were injured during operation; one after a hysterectomy, with the result that a peculiar growth made its appearance which complicated the repair. Dr. Brooks, the pathologist, said it was an angioma with certain epithelial elements in it. I removed it with the thermocautery as a preliminary to the final operation. It is now eight years since that operation and there is no recurrence of the growth.

The carcinoma of the bladder, springing from a pedicle, was a most discouraging case; the carcinomatous growth seemed to fill the bladder.

A vesicovaginal fistula may be left several months until the tissues have become healthy before closure.

These were all ideal cases in which to use silver wire. Silver wire is most valuable where wounds are exposed and cannot be dressed. The silver wire has a tendency to inhibit bacterial growth, and should be used where one cannot apply an antiseptic dressing. There is some trouble in removing it, but if one gets a good result he need not mind if the patient complains a little about the removal of the suture. The method of splitting and sliding flaps has its use in appropriate cases. Certain tumors press against the ureters and it has been thought that in removing them it must follow that the ureters would be cut. One may cut a ureter purposely in some cases during an operation, but to cut it by accident is a confession that one is not sufficiently careful.

DR. HENRY DAWSON FURNISS read a paper on

PELVIC VARICOCELE.\*

DISCUSSION.

DR. EDWARD W. PINKHAM said: The discussion of a paper with the writer absent is not a very pleasant duty, because a paper is always written from the personal standpoint and must be discussed from that angle; one cannot discuss it in the abstract. Therefore, I will not discuss Dr. Furniss's paper but will merely say a few words on this subject because, as you all know, it is one that has greatly interested me. I feel that pelvic varicocele is a pathological entity, especially in those cases in which the pampiniform plexus is so dilated that it cannot empty itself. I believe that a vein once varicosed never recovers its tone nor its muscular strength and that therefore there is no cure for pelvic varicocele but to venous stasis except removal. Relief may be obtained by raising the plexus.

The diagnosis and etiology of pelvic varicocele is not so important; there are many things beside phlebitis that may cause it. The diagnosis must be made by exclusion. It occurs very much oftener on the left side than on the right side. I have seen many cases with the abdomen open and know it may occur in the absence of any gross pathological condition on one side or the other. Where other conditions have been excluded and there is a grinding steady pain, a pain that is continuous, it is comparatively safe to venture the statement that that type of pain is rarely caused by the ovary. This is about the only way one can make a diagnosis. In thin women, if one has very exquisite fingers he can sometimes feel a fullness of the veins which he can milk out and this helps in the diagnosis.

Then the method of treatment is to be thought of. When other conditions, as lacerations, retrodeviations, etc., exist, it is wiser to repair these first and if one sees a varicosed condition it is better to ligate the veins than to leave them alone. It is also wise in searching for enlarged veins "to go easy" in making a diagnosis of varicosity, for sometimes these veins do not involute completely after childbirth and yet the woman may have no symptoms referable to the veins. Starting in to ligate all enlarged veins would be rather a questionable procedure. In doing a ligation the double ligation is the best and in putting on the ligatures one must be careful not to puncture any veins. My results in the cases in which I have ligated the veins have been very good, in some cases remarkable. All the women were more or less neurotic and in two instances the operation made new women of them; in another instance the woman was only relieved of the constant grinding pain. I think we should recognize pelvic varicocele as a clinical entity and when it is a clinical entity and is properly treated we get good results.

DR. JAMES N. WEST said: I thought for years that this condition of varicosed veins was having too much stress laid upon it, since we know that the pelvic veins, especially those of the broad ligaments,

\* For original article see p. 152.

ovaries and uterus, are so arranged that they take care of the circulation during pregnancy, and I was of the opinion that a great deal of the supposed varicosity existed in the imagination of those looking for it. After reading Dr. Pinkham's paper I felt satisfied that my point of view was rather superficial and I have since felt that a certain number of patients have this condition and that where it can be positively diagnosed it should be relieved. When cutting out a piece of the broad ligament one should be very careful to avoid hemorrhage. When we operate on varicose veins, existing as a pathological entity we should be very sure that we have complete hemostasis before we close the abdomen. It is better to be careful at the time of operation than to have to go back to the patient at night and try to save her life. I have not felt that I am sufficiently versed in the diagnosis of this condition to operate purposely for it, but if one can be sure that the patient has varicose pelvic veins he should not hesitate to operate.

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### ITEM.

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The annual meeting of the American Gynecological Society will be held in Pittsburgh, Pennsylvania, on May 31st, June 1st and 2d, 1917.

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### REVIEWS.

**THE PRACTICE OF UROLOGY.** A Surgical Treatise on Genito-urinary Diseases Including Syphilis. By CHARLES H. CHETWOOD, M. D. LL. D., F. A. C. S., Professor of Genito-urinary Surgery, New York Polyclinic. Visiting Surgeon to Bellevue Hospital, etc. Pp. 825, profusely illustrated. Second Edition. New York: William Wood and Company, 1916.

In this, as in the former edition, if the maladies treated of are the same in women as in men they are included, but so far as they affect the organs peculiar to women they are not. In addition to distinctly urological subjects a section on syphilis is included. In the second edition the subject of cystoscopy has been elaborated; additions to operative technique have been made, and a section on local anesthesia has been inserted. The volume is an important treatise on genito-urinary diseases and their operative and other treatment.

**TEXT-BOOK OF HISTOLOGY.** By FREDERICK R. BAILEY, A. M., M. D. Fifth revised edition. Pp. 652, profusely illustrated. New York: William Wood and Company, 1916.

This standard text-book has been thoroughly revised, though the Fifth Edition shows no change in its general scope. It was originally planned as a manual for teaching, hence its characteristics are brev-

ity and clearness. The section on the nervous system, being up to date, has not been revised. The work is admirably suited to the use of students of histology.

**A PRACTICAL MEDICAL DICTIONARY of Words used in Medicine with Their Derivation and Pronunciation, Including Dental, Veterinary, Chemical, Botanical, Electrical, Life Insurance and Other Special Terms; Anatomical Tables of the Titles in General Use, and Those Sanctioned by the Basle Anatomical Convention; Pharmaceutical Preparations, Official in the U. S. and British Pharmacopeias and Contained in the National Formulary; Chemical and Therapeutic Information as to Mineral Springs of America and Europe, and Comprehensive Lists of Synonyms.** By THOMAS LATHROP STEDMAN, A. M., M. D., Editor of the "Twentieth Century Practice of Medicine," of the "Reference Handbook of the Medical Sciences," and of the "Medical Record." Fourth, Revised Edition. Pp. 1102, illustrated. New York: William Wood and Company, 1916.

A new-comer in 1911, this dictionary has so rapidly won its way into the favor of the medical profession as to call for four editions within five years. Such frequent revision justifies its popularity. The breadth of scope of the volume is shown in its title, which shows its inclusion of the allied sciences as well as medicine. It contains also homeopathic, eclectic and eponymic terms. The last are considerably increased in this edition which defines about two thousand more terms than its immediate predecessor. Compact, scholarly and accurate, its typographical work and flexible red morocco binding leave nothing to be desired save the thumb index which is optional.

**VACCINE THERAPY IN GENERAL PRACTICE.** By G. H. SHERMAN, M. D. Also Quotations from Other Authors. Third Edition. Pp. 523. Detroit: G. H. Sherman, 1916.

The third edition of Sherman's "Vaccine Therapy in General Practice" is apparently the work of an honest-enthusiast who feels that his belief in the efficacy of mixed vaccines in the treatment of all diseases which are due to or may be complicated by infection is receiving the support of many observers. The book opens with a discussion of the underlying principles of vaccine therapy. The remainder of the volume takes up its indications, limitations and applications. The author quotes very freely from writers who support his views and reports many illustrative cases. He writes with an assurance that would carry conviction to the mind of any general practitioner if it were not that the results seem almost too uniformly good to be true and that the mind of to-day finds it difficult to believe in a panacea especially when advocated by one who is engaged in the preparation and distribution of the remedy. This is intended not as a condemnation of the book or of the method but as a note of warning to the over sanguine.

H. D.



## BRIEF OF CURRENT LITERATURE

## OBSTETRICS

**Occurrence of Tubercle Bacilli in Breast Milk of Tuberculous Women.**—S. L. Wang (*Bull. Dept. Pub. Charities*, N. Y. City, 1916, i, 32) reports that 65 specimens of breast milk of five tuberculous mothers in Sea View Hospital were examined for tubercle bacilli insmears and by its antiformin method.

There was no apparent mammary disease or suspicion of such in any case. One was positive once and one other specimen from the same case, suspicious once. This case had negative sputum, which was ascertained by repeated examinations for over 8 months, no symptoms of active pulmonary disease and her tuberculous bone lesions progressed very favorably. The specimens from the various cases were taken during all periods of mammary activity, before (in one case 88 days) and after delivery and in one case who nursed her child. The case represent the common types of tuberculosis, two moderately advanced, one far advanced uncomplicated, one far advanced complicated with tuberculous laryngitis and one non-active pulmonary case complicated with active tuberculous bone conditions.

The number of cases is so small that they show only the possibility of occurrence of tubercle bacilli in the breast milk of tuberculous women who have no apparent mammary disease. The one positive case occurred in the mother whose lesions (low grade bone conditions) seemed to progress the most favorably.

**Perineal Anesthesia in Labor.**—R. W. King (*Surg. Gyn. & Obst.*, 1916, xxiii, 615) describes the following technique for producing perineal anesthesia in labor. Prepare a 2 per cent. solution of novocaine in normal saline, sterilize it by boiling, allow it to cool, and add  $\frac{1}{8}$  of a minim of 1 : 1000 solution of adrenalin chloride to each cubic centimeter. Palpate the pubic arch to be sure of the landmarks. Wash the site of each injection with alcohol or benzin followed by the official tincture of iodine. Spray each site lightly with ethyl chloride before entering the needle. In the anterior triangle enter the needle 2 to 4 centimeters above the lower margin of the vagina and 2 centimeters from the rami. Pass the needle 2 to 4 centimeters in depth, corresponding to the level of the hymen or its remains, and the expression of sudden pain as the needle meets the positive resistance of Colles' fascia will indicate the proper depth; pass the needle through the fascia and inject the solution. In the anterior triangle, use  $1\frac{1}{2}$  c.c. of the 2 per cent. solution for each injection. In the posterior triangle incline the needle laterally and enter it midway between the anus and tuberosities to a depth of 4 centimeters. In the posterior triangle use from

5 to 10 c.c. of a 1 per cent. solution in each injection, varying as to the adiposity of the subject. The injections are made bilaterally. Primiparae require only the anterior injection. Multiparae may require both anterior and posterior injections. No adverse results have followed nearly 100 injections. A slight superficial necrosis of the inner lips of the labium has followed the injection of stronger solutions of adrenalin, but this in all cases cleared without harm. Anesthesia begins in a few minutes and is prolonged two to four hours. Lacerations are diminished in number and extent, for the consciousness without pain of the patient allows retardation or advancement of the presenting part at will, thereby developing the fullest elasticity possible. Hemorrhage from lacerations is greatly diminished, due to the adrenalin and lessened extent of tears. Repair is greatly facilitated because of the duration of the anesthesia. Benzin or alcohol and iodine sterilization of the obstetric area can be rapidly and painlessly carried out under this procedure when the posterior triangle is infiltrated. The general practitioner can safely and easily apply the method at the bedside.

**Dental Disease in Nursing Women.**—H. Waller's (*Lancet*, 1916, cxc, 785) experience has led him to believe that if the removal of dental disease is adequately carried out, even after it has produced symptoms, improvement in the woman's health is sufficiently rapid and substantial to be of signal benefit to her child. Two changes should follow treatment if its effect on a woman's general health is sufficient to influence lactation: (1) the rate of gain in the child's weight should be accelerated, and (2) the length of time over which nursing can be carried out should be prolonged. Improvement capable of registration occurred in 80 per cent. of about 200 cases studied by the writer.

**Streptococcus Infection as a Cause of Spontaneous Abortion.**—Study of the *Spirochaeta pallida* has already demonstrated one infectious organism which is directly responsible for death of the fetus in the later months. That other varieties of bacteria should likewise possess the power of interrupting the course of pregnancy is to be anticipated. Conclusive evidence that such infections occur, demonstration of the characteristics peculiar to the invading organisms, and discovery of the foci from which reinfection develops in subsequent pregnancies, should do much to stamp out hitherto inexplicable cases of stillbirth. The object of a report by A. H. Curtis (*Jour. A.M.A.*, 1916, lxvii, 1739) is to produce evidence which is helpful in the solution of this problem. From the urine of a mother whose child was born dead, also from the placenta and heart's blood of a stillborn child, smears and cultures yielded large numbers of streptococci. Intravenous inoculation of pregnant rabbits was followed, in every instance, by abortion or absorption of the fetuses with recovery of the streptococcus in pure culture from the maternal uterus.

**Non-protein Nitrogen and Urea in Maternal and Fetal Blood at Time of Birth.** J. M. Slemons and W. H. Morriss (*Bull. Johns Hopk. Hosp.*, 1916, xxvii, 343) found that in 35 normal obstetrical

patients at the time of birth the average rest-nitrogen in the maternal blood was 25.2 mg. per 100 c.c. (extremes 18.5–33.5 mg.); in the fetal blood the average was 24.9 mg. (extremes 19–34.2 mg.). In 16 normal patients the average quantity of urea-nitrogen in the maternal blood was 10.5 mg. per 100 c.c. (extremes 8.4–14 mg.); in the fetal blood the average was 10.4 mg. (extremes 7.9–13.5 mg.). The urea-nitrogen represented 44 per cent. of the rest-nitrogen in the maternal and 45 per cent. in the fetal blood. The same concentration of urea in both circulations indicates that this substance passes through the placenta by diffusion. Before this is said of the rest-nitrogen, each of its constituents should be studied separately, though it appears that equalization of the rest-nitrogen is normally maintained on the two sides of the placental partition. Complications accompanied by an increase of urea in the maternal blood—toxemias of pregnancy, syphilis, decompensated heart lesions, and others—are also attended with a corresponding increase in the fetal blood-urea. Pathological cases thus confirm the conclusion that urea diffuses through the placenta. The administration of chloroform during pregnancy causes alterations first in the fetal and later in the maternal blood. Primarily the fetal blood-urea is increased. Prolonged anesthesia causes a moderate increase in the rest-nitrogen of both circulations. Asphyxia dependent upon impairment of the fetal heart-action is attended with a notable increase in the urea of the fetal blood. In cases of still-birth this generally represents 60 to 85 per cent. of the rest-nitrogen.

**Pubiotomy in Impacted Face Presentations.**—P. Titus (*Surg. Gyn. & Obst.*, 1916, xxiii, 733) reports the eighth recorded pubiotomy done for this indication. The results were entirely satisfactory save for an infection of the pubic incision. The writer believes that, in cases of mentoposterior face presentation seen after engagement, a reasonable test of second stage should be allowed the patient in the hope that anterior rotation will take place, either spontaneously or with the assistance of carefully performed manual attempts at rotation. Attempts to rotate by means of forceps are dangerous to both the child and the mother. Cesarean section is directly contra-indicated because of its high mortality in these cases. Craniotomy is the operation of choice if the child is dead or *in extremis*, but it is by no means as innocuous as is generally assumed. Pubiotomy is the operation to be selected in those cases where the child is alive and in good or even fair condition, and craniotomy on a living child presenting in this fashion is entirely unjustifiable.

#### GYNECOLOGY AND ABDOMINAL SURGERY.

**Perithelioma and Endothelioma of the Uterus.**—W. A. N. Dorland (*Surg. Gyn. and Obst.*, 1916, xxiii, 576) describes a case of perithelioma of the uterus. From a pathological and clinical review he concludes that endothelial tumors of the uterus develop late in life—much later than sarcomata—the peritheliomata generally occurring at the most advanced age. These growths are especially prone to occur in a preexisting neoplasm—a myoma or a fibro-

myoma. While showing a high degree of local malignancy they but rarely give rise to metastatic deposits elsewhere. It is probable that endothelial uterine tumors occur more frequently than would appear. Hence the importance of early removal of all uterine growths, which should always be subjected to a careful pathologic examination.

**Etiological Study of Ovaritis.**—From a cultural study by C. H. Davis (*Surg. Gyn. and Obst.*, 1916, xxiii, 560) of 62 ovaries showing the changes found in fibrocystic degeneration and three in which the process was more acute, the findings of the streptococcus viridans in 50 per cent. of the cultures suggests that the streptococcus viridans is the most common organism associated with chronic ovaritis. Since the cultures from ten ovaries remained sterile, it would appear that chronic degeneration may result without the presence of bacteria or that the bacteria are gradually killed and the ovary rendered sterile. The findings of the gonococcus in only one acute and one chronic ovary would seem to indicate that this organism may not be responsible for as much of the chronic ovarian disease as was formerly supposed. The Welch bacillus was found in small numbers in 33 per cent. of the cases, yet in the absence of any definite animal experiments it may be considered a more or less harmless invader; still it must be remembered that this organism has been the cause of puerperal sepsis. The staphylococcus albus and the diphtheroid bacillus are regarded as accidental or harmless invaders since intravenous injections of each do not produce lesions in animals. It has long been recognized that chronic ovarian degeneration may follow acute infections of the ovary, and this study shows that bacteria must also be regarded as the etiological factor in chronic ovaritis though it has developed without a definite history of an acute infection. The various conditions which cause passive congestion in the pelvis are to be considered as predisposing and not as etiological factors. The not uncommon history of pelvic trouble following anginal attacks during the menstrual period; the occurrence of pelvic infection immediately following tonsillitis; the discovery of chronic tubo-ovarian inflammation in a young woman with a congenital stenosis of the cervix and the uterus, with an imperforated vagina, and the isolation of the streptococcus viridans from her left ovary; together with the experimental production of ovaritis in animals seems conclusive proof that hematogenous infection of the ovaries occurs and that it may be responsible for much of the chronic ovaritis in which there is not a definite history of gonorrhea or puerperal sepsis. The find of bacteria, especially the streptococcus viridans, in the greater portion of the ovaries cultured, offers a logical explanation for the not infrequent recurrence of cystic swellings after resection of the ovary. It also suggests that ignition or drainage through a single opening with Paquelin's cautery may be the method of choice since the heat may kill the bacteria. This study also shows a probable reason why transplanted ovaries degenerate. Since some ovaries are sterile and many others contain only a few organisms, the writer believes that his study favors

conservation of the ovaries whenever the operative findings will permit. In this series it was usual to find rather large numbers of streptococci in the ovaries of patients who came to a second operation. With a young woman it is better that she come to a second operation than to lose both ovaries the first time even if there is an equal chance that conserved tissue may degenerate. The findings of bacteria in fifteen (eleven of which showed streptococcus viridans) of the eighteen degenerated ovaries associated with fibroids of the uterus suggests strongly that bacteria are likewise responsible for the chronic ovaritis so commonly associated with fibromyomata. Since there appears to be very frequently some rather definite connection between the more common foci of chronic infection and ovaritis, it is evident that in treating a patient with ovarian trouble, any such foci should be located and removed. It would seem logical to believe that by the early detection and elimination of these primary infections it might be possible to lessen the occurrence of ovaritis.

**Study of the Menopause with Special Reference to its Vasomotor Disturbances.**—This is presented by C. Culbertson (*Surg. Gyn. and Obst.*, 1916, xxiii, 667) with brief reports of 29 illustrative cases. He says that the menopause is a functional derangement on the part of various glands of the endocrine system subsequent to the cessation of the ovarian secretion. On this basis may be explained the psychic and somatic manifestations of the menopause. The vasomotor disturbances represent an instability of arterial tension. *a.* In the majority of cases this takes the form of a vacillating hypertension, both systolic and diastolic. *b.* The diastolic pressure is not elevated proportionately to the systolic. This produces an increased pulse-pressure. *c.* Hot flushes, sweating, and other vasomotor symptoms are directly created by the vacillations in arterial tension. *d.* In a minority of cases there is arterial hypotension and here also the systolic and diastolic pressures are out of proportion. Hypertension is apparently due to a relative oversufficiency on the part of the hypophysis or the adrenals. The psychic symptoms are apparently influenced by thyroid dysfunction; in the majority of cases a hyperthyroidism, in the minority, a hypothyroidism. The administration of the missing hormone, represented by the extract of corpora lutea from animals in early gestation, brings about a gradual restoration to normal of the blood-pressure with disappearance of the mental symptoms. This reduction of blood-pressure by organotherapy together with the disproportionate systolic and diastolic rise is offered as evidence that the hypertension is a functional one and not due to organic changes. Blood-pressure estimation is essential as a means both of measuring the degree of menopause disturbance and of controlling its therapy. An occasional pressure reading is of little or no value. Tension must be determined at frequent intervals, preferably daily until improvement is well under way. The significance of functional hypertension as a factor in uterine hemorrhage is obvious.

**Pelvic Massage for Post-operative Adhesions.**—F. Herb (*Amer. Jour. Surg.*, 1916, xxx, 342) says that danger from breaking adhesions is not present, if the work is done slowly and carefully. A distinct snap marks the moment when the tear occurs and it is followed by an increased movability of the organ treated. Massage should never be begun at a time when there is still danger from bleeding or so long as a recrudescence of the inflammation may be feared, nor should massage be postponed until the adhesions are firm and solid. As a rule, a beginning may be safely made when the abdominal wound is securely healed. It is well to give the first treatments in a tentative way, very light and not longer than, perhaps, a minute or two. The subsequent reactions will determine how quickly the later treatments can be pushed. Surgeons should have pelvic massage applied in all instances in which they find undue swelling, sensitiveness or infiltration, or where, for other reasons, the formation of adhesions is expected.

**Expedient for Radical Cure of Some Retroversions.**—The suggestion of E. Reynolds (*Bost. Med. & Surg. Jour.*, 1916, clxxv, 830) is that at a period in the puerperium at which the uterus is too large to be capable of retroverting, *i.e.*, between the tenth and fifteenth day of the puerperium, the uterus should be thrown into strong anteversion bimanually, and a carefully fitted, hard rubber pessary, usually larger than the stock sizes, should be made to hold it there. Very hot vaginal douches should then be administered twice daily. From 2 to 4 quarts should be used, and the injection should last from fifteen to twenty minutes. It should be given with a fountain syringe and under a fall of not more than 12 to 15 inches in order to avoid forcing fluid through the open os. In most cases it will be found that within a week the original pessary will have become too large and too highly curved for the contracting vagina. A second and smaller, but equally well fitting, pessary should then be adjusted, and the douches continued. This will usually need to be replaced by one of lesser size in from ten days to a fortnight, and after a few weeks this must again be reduced. The hot douches should be continued until the uterus is but little above the normal size and firmness, but should then be intermitted, as too long a continuance of the douches sometimes results in hyperinvolution, which might cause subsequent dysmenorrhea.

**Value of Cystography in Bladder Surgery.**—The study of H. L. Kretschmer (*Surg. Gyn. & Obst.*, 1916, xxiii, 709) shows that cystography is a valuable adjunct to our present diagnostic methods. It will always have a limited field of usefulness. Great care must be exercised in interpreting cystographs. Because of its limitations and possibilities of misinterpretation, cystography can never hope to take the place of cystoscopic examination, but should be used as an adjunct to it and not instead of it. Filling defects in the bladder may be due to a variety of causes: first, lesions outside of the bladder preventing a complete filling, so that the normal outline of the bladder is not obtained; second, lesions of the bladder-wall—these may be limited to a part of the bladder wall, such as that seen in tumors,

so that an incomplete filling results; third, filling defects may be due to insufficient filling of the bladder. Great care must be exercised in interpreting these filling defects, because of the variety of causes that may produce them. That wrong conclusions and necessarily wrong diagnoses must ensue if each filling defect is to be ascribed to lesions within the bladder or bladder-wall, is obvious. The filling defects as demonstrated in some cystographs obtained in cases of parametritis in no way differ from the defects seen in some cases of primary carcinoma of the bladder. Cystography may be of aid in determining whether resection or fulguration should be employed in a certain percentage of papillary tumors. For outlining the number, size, and position of diverticula, cystography is easily the method of choice. That regurgitation of fluid from the bladder into the ureter is possible in normal individuals, has been demonstrated. It has also been possible to demonstrate a regurgitation of fluid from bladder into ureter, in the presence of bladder infection, though the ureteral orifice appeared normal.

**Actual Cautery in the Treatment of Chronic Ulcer of the Stomach.**

—To determine whether there is any difference in the reparative process taking place after cauterization of the stomach-wall as compared with the reparative process following a simple incision with the knife experiments upon dogs were performed by C. L. Scudder and S. C. Harvey (*Surg. Gyn. & Obst.*, 1916, xxiii, 719). They found that the amount of tissue injured by the actual cautery is perhaps slightly greater than that by the knife. It appears that the suture of the cauterized margins of the stomach-wall is attended by practically a normal reparative process similar to the reparative process following a simple incision with the knife. This seems to show that the method is a safe method for ordinary use in the human. The method is applicable to a chronic ulcer seated upon the lesser curvature so far away from the pylorus as to make its easy removal by excision difficult. Such an ulcer may be cauterized from the center out, as suggested by Balfour, so that the loss of substance occasioned by the cauterization may be as large as  $1\frac{1}{2}$  inches or more in diameter and the edges may be then approximated with the assurance of a proper healing of the wound. Ulcers seated on the posterior wall of the stomach which are safely approached by a gastrotomy incision, may have their *edges* thoroughly cauterized and also the *base* thoroughly cauterized even when it is adherent to the pancreas, and be sutured with the assurance that the reparative process will proceed satisfactorily. Certain chronic ulcers adherent to the posterior parietes and pancreas do not lend themselves to easy and safe excision and suture. The cautery is sometimes applicable to this special group of cases. The cautery will destroy any beginning cancer in the edges of the ulcer if the cauterization is thoroughly done. The employment of the cautery saves considerable time over the simple excision method. Following the use of the cautery no large gaping wound exists, and the stomach is closed more readily than after wide excision by the knife. The suture material employed in human cases in each instance has been No. 1

chromic catgut. It has not been found necessary to reinforce the sutured area by interrupted linen suture of the peritoneal surface in all cases. If it is possible to place these interrupted linen sutures it is wise to do so. Following any extensive plastic of the stomach, a gastroenterostomy should be done.

**Abdominal Operation for Cystocele.**—As described by F. G. DuBose (*Surg. Gyn. & Obst.*, 1916, xxiii, 727) this procedure is as follows: After incising transversely the vesicouterine peritoneal fold, separation of the bladder by blunt dissection from the uterus completely and from the upper inch or more of the anterior vaginal wall is done, so that the bladder (being thoroughly mobilized) may be lifted well up and forward from these attachments. The round ligaments on each side are caught, united, and attached to the most dependent part of the vesicovaginal denudation, with a linen suture passed well into the anterior vaginal wall. Another suture or series of sutures of linen approximates the frayed or torn ends of the vesicouterine ligaments and attaches them to the anterior and upper cervical portions of the uterus. By letting the needle bite be far out laterally to include the ends of the vesicouterine ligaments, a narrowing of the anterior vaginal wall in its long axis occurs. The slack is also taken up in the relaxed pelvic aponeurotic diaphragm. Added to this restoration is the support of the round ligament folds. If these ligaments are attenuated and there is still a doubt that the relaxation and decensus will not be overcome by these supports, then artery forceps may be forced through the broad ligaments about on a line with the internal os laterally so that the forceps will catch in the bite the loose folds of the sacrouterine ligaments and pull them through. The ends of these ligaments are then sutured together with linen and these ends in turn sutured to the denudation on the upper cervical portion of the uterus, serving to pull upward and backward the cervix uteri, and to take up the slack in the relaxed sacrouterine folds. Successive tiers of chromic catgut sutures are placed so as to approximate the bladder on the uterus at a much higher level than its former normal attachment. Before this suture line is completed, it will be found easier to plicate with linen the round ligaments on each side—including in suture the wall of the uterus laterally and the incised edge of the broad ligament peritoneum. This (running) fine linen or silk-suture continues until the plicated round ligament approximates its original attachment into the uterus, restoring its original point of traction on the fundus uteri. One or more catgut sutures are placed between the uterus and bladder until the former reflection of the bladder is raised to the fundus and attached by a running suture (of catgut in the fertile, linen in the sterile) along a line running above the uterine insertion of the round ligaments. The operation is completed by a continuous suture turning in and approximating the peritoneal edges of the bladder laterally to the broad ligaments and to the fundus of the uterus above.



# DEPARTMENT OF PEDIATRICS.

## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

### SECTION ON PEDIATRICS.

*Meeting of November 9, 1916.*

ROYAL STORRS HAYNES, M. D., *in the Chair.*

*This program was arranged under the auspices of the Pediatric  
Department of the Post-Graduate Hospital.*

#### ECZEMA DUE TO DEFICIENT THYROID SECRETION IN WHICH THE ADMINISTRATION OF THYROID ACTED AS A SPECIFIC.

DR. M. H. EDELMAN presented this patient, a boy, three and one-half years of age, born in the United States of Hebrew parentage. The family history was negative except that the mother and a sister became gray at twenty years of age. The mother has had two other children and two miscarriages. While pregnant with the patient she is said to have suffered from gravel in the bladder, for which she was under treatment. Her diet during pregnancy and lactation consisted of cooked fruits, cereals, fresh vegetables and milk, but no red meats. The patient has had none of the diseases of childhood, but had furunculosis at the age of six months. The child was weaned at the age of ten months and put on a diet of milk, water, cereal and fruit juices; his diet at the present time is practically the same except that eggs, sugar and butter are given in moderation. The child has been very constipated and slept poorly. Since the age of four months he has had a scaly, weeping eruption, involving the cheeks, forehead, chin, scalp, neck, shoulders, chest and upper and lower extremities. In spite of three years constant treatment by pediatricists and dermatologists in various clinics the eruption became more extensive. For the past year the mother noticed the child looking old, not playful, extremely quiet and masturbating. Withdrawal of food and modification of the diet had no effect on the eruption. The child apparently developed in a normal way and has always been considered a bright child.

On July 22, 1916, he was brought to the Out-patient Department of the Post-Graduate Hospital. At this time the physical examination showed the cretinoid facies, pasty complexion, and general glandular enlargement. The mentality was normal. The child stuttered. The head was regular in shape, with no bone

sutures and the fontanelle closed. The hair was coarse and abundant; the scalp showed seborrhea and was covered with crusts. The skin eruption showed the distribution above described. The eyes had a small opening and reacted to light and accommodation; the pupils were equal; there was edema of the upper lids and puffiness of the lower lids. The eyebrows were deficient; the upper eyelashes were normal; the lower scant and fine. The mouth was open; the nose saddle-shaped. The tongue was moist, clean, and seemed to fill the mouth. The tonsils were small and imbedded and adenoids were present. The neck was tense and the child unable to turn his head due to the tenseness of the skin. The lungs showed a few coarse râles posteriorly. The abdomen seemed enlarged and distended, though the liver and spleen were not palpable. There was a slight umbilical hernia and lordosis. There was hyperplasia of the penis, and a state of priapism; both of the testicles were in the scrotum and seemed to feel normal. The reflexes were normal. The first blood examination showed hemoglobin 70 per cent., red blood corpuscles 4,200,000, white blood corpuscles 6500, polynuclears 62 per cent., leukocytes 36 and eosinophiles 2 per cent. The Wassermann, luetin and von Pirquet reactions were all negative.

The child was given thyroid extract,  $\frac{1}{2}$  grain daily. No change was made in the diet. Bran baths were ordered every night.

On August 2 the child returned looking like a different child. The eczema of the scalp, face and neck had almost disappeared and that of the legs had improved slightly. The mother volunteered the statement that for the first time in three years the child slept through the night. Improvement continued during the following week, but owing to loss in weight the thyroid was discontinued, sugar and fats were eliminated from the diet and *Unguentum Lorzai* was used for local application. The patient then became worse and thyroid extract was again administered,  $\frac{1}{4}$  grain daily. Again there was a marked improvement. The child has since been gaining in weight and at the present time is getting 1 grain of thyroid extract daily, but he still retains the cretinoid facies. The skin eruption while still present is very much improved.

The interesting points in this history are: (1) the premature grayness of the mother and her sister and their rather pasty complexions, suggestive of deficient thyroid secretion, which make it seem probable that the mother is responsible for the child's condition; (2) the presistency and extent of the eczematous condition in spite of careful dietetics and local treatment, which suggest a rather complex etiology; (3) the eczema seems to bear no relation to the food. The improvement under thyroid extract and the regression when this medication was withdrawn, point to a condition of hypothyroidism. A review of the literature shows that a large variety of dermatoses may be due to deficiency of thyroid secretion. In considering the treatment of hypothyroidism it must be borne in mind that a child with deficient thyroid secretion has lessened metabolic powers. Talbot found that the metabolism of a cretin three and one-half years of age was about equal to that of a normal child eight months of age. This means that we must give less food to these children at

the beginning and increase the food as they improve. Fairly large doses of thyroid extract should be administered at first in order to remove the results that may have been produced by provocation of thyroid secretion; later smaller doses are given to maintain a normal equilibrium, and prevent a recurrence. In conclusion it may be said that if we regard lesions of the skin as symptoms rather than a disease, greater progress will be made in diagnosis.

DR. HAYNES.—Has there been much change in the condition of the tongue?

DR. EDELMAN.—Yes, it was much further out than it is at present.

DR. JAMES LOUIS JOUGHIN reported a case of

#### DYSTONIA MUSCULORUM DEFORMANS.

Dystonia musculorum deformans is one of two names given by Oppenheim to a peculiar disorder of station and locomotion first described by him in 1911. He also called this disease "dysbasia lordotica progressiva" but preferred the former appellation and it has been the one more generally accepted.

Oppenheim, on the basis of four cases, describes the essential characteristics of the disease, stating that it occurs in children or young adults of Jewish parentage, and is characterized by tonic and clonic spasms of the muscles supporting the pelvis the lumbar and abdominal muscles and the muscles of the upper and lower extremities. The onset is insidious; it usually manifests itself first in the arms but the pelvis girdle and lower extremities are ultimately most affected. As a result of the tonic and clonic spasms the body gradually assumes a bizarre position not met with in other affections. On first viewing the patient the inability to stand upright is the most striking characteristic. The trunk is slightly flexed forward in early cases, in cases of longer duration markedly so, upon the pelvis and in addition to this it tends to sag to one side and at the same time rotates somewhat upon the pelvis. The patient attempts to overcome this forward ptosis of the body by placing the hands upon the thighs just below the groins and as the disease progresses and the trunk continually increases its forward flexion, he slides his hands down the anterior aspect of the thighs, until finally he stands propping up the trunk with the hands resting above the knees. The arm or arms are usually held with the forearms pronated; active supination was often impossible and on attempting passively to supinate the arms, this was usually opposed by a marked series of clonic contractions appearing in the pronator radii teres and internal rotators of the arm which tend to restore it to the pronated position. The lower extremities vary somewhat in position, generally one leg being more affected than the other, and the patient stands by preference on the less affected leg. The legs are usually flexed and are sometimes adducted or rotated inward by the tonic spasm of the muscle groups. Talipes equinus varus is an early and frequent deformity. This peculiar posture so marked when the patient is standing becomes immensely exaggerated as soon as he attempts to walk. Tonic contractions of the abdominal, lumbar and thigh

muscles jerk the trunk forward, backward or to either side. Nearly all of these deformities and especially those of the spinal column disappear when the patient is either dorsally or ventrally recumbent. The reflexes vary within narrow limits from time to time. Generally there is weakness of the tendon reflexes of the more spastic extremities. There is no pain and no objective sensory disturbance. In Oppenheim's cases the sphincters, cranial nerves and speech were unaffected; there was no paralysis and the mentality was normal. The course of the disease is slowly progressive with remissive tendencies. No etiological factor has been decided upon.

The case reported varies from this description to a slight extent. The patient is a young girl, nine years of age, whose family and personal history are negative as regards the dystonia. The positive points in the history and symptomatology of this patient are the insidious onset, in May, 1915, beginning with slight jerking of the right arm and turning in of the left foot. She shortly after began to bend forward and her condition at present is as follows. The tendon reflexes are very variable. The left knee-jerk and the ankle-jerk are sometimes easily obtained and at other times only with great difficulty. The attitude is that so well described by Oppenheim. The left leg is held extended and inwardly rotated. The great toe is usually extended and the other toes are occasionally widely separated. Myoclonic contractions can be plainly felt in the left anterior tibial groups and the toes separate, extend, and flex in a way suggestive of athetosis. The foot is in a varus position and the patient walks on the outside of it. It can be easily completely everted but a series of strong, clonic contractions on endeavoring to invert it are thus produced, and it at once again becomes everted. The right arm is held partially abducted, partially flexed, inwardly rotated and the forearm is pronated. Myoclonic contractions also occur in the muscles of the shoulder girdle and the upper arm. The patient can supinate the forearm but it is at once jerked back again into the pronated position by strong contractions of the pronator radii teres. The patient walks by advancing the inwardly twisted left leg a few inches and dragging the right foot up to it. The jerking of the trunk described as occurring when the patient attempts to walk is very little evident. On removing her hands from the thighs the whole trunk collapses forward and the torsion of the trunk and the tipping of the pelvis materially increase. The kyphosis disappears on lying down and the spine can be flexed dorsally without difficulty. Two series of photographs show that the disease is slowly progressive. The patient has a stutter or stammer of the functional type, which is the last of her symptoms to develop. Oppenheim at first considered these cases to be of a hysterical nature or a peculiar form of double athetosis. At the time of the publication of his article he considered them as due to some undetermined lesion of the brain analogous perhaps to the anatomical basis which we infer exists in paralysis agitans. This view is not generally accepted; most men to-day regard the disease as a peculiar form of tic neurosis or possibly another of the multiform manifestations of hysteria. Opposed to

Oppenheim's view is the absence of any organic disturbance of the central nervous system and the widespread and fluctuating character of the symptoms which it would be difficult to reconcile with an anatomical lesion. Opposed to the functional view is the absence of suggestion or emotion as a genetic factor, the chronic progressive course and the changes in the reflexes which are not met with in a purely functional condition. However, I feel that it will ultimately be definitely included in this latter category.

PRIMARY SPLENOMEGALY GOUCHER TYPE.

DR. ROGER H. DENNETT.—In 1882 Goucher reported the first case of primary splenomegaly. Since then fourteen authentic cases have been reported in the literature, all occurring in seven families, eight children of these same families dying during infancy of unknown diseases. In only six cases was the diagnosis absolutely authentic. David Bovaird was the first in this country to report a case (*American Journal of American Sciences*, 1900). Since then De Jong and Van Heukelon have reported three cases, Reuben has reported two cases, Niemann has reported one case, Erdman and Moorhead have reported two cases, Bernstein two cases and Hermann one case. Mark S. Reuben, in the *American Journal of Diseases of Children*, November, 1914, has given the most complete review of the literature and description of the disease that has yet appeared, and I would refer anybody to that article for a detailed description of the disease and all the cases that have been reported. The congenital character of this affection is very evident, since more than one case in a family occurred in all but two of the cases reported. Of the eight authentic cases which have been verified, five by autopsy, and three by the antemortem removal of the spleen, the pathological findings were identical. The liver and spleen are enormously enlarged, retaining their normal shape, and macroscopically are firm and resistant. Microscopically the spleen shows a large number of alveolar spaces filled with large endothelial cells which are typical of the disease, and which, together with connective tissue, are the cause of the increased size of both the liver and spleen. The symptomatology and physical findings of primary splenomegaly consist in brief of an enormously enlarged spleen and somewhat enlarged liver, unaccompanied by any enlargement of the lymph nodes, or by any marked change in the blood. The patient usually comes for treatment because of the enlargement of the abdomen which has attracted attention, often unaccompanied by any symptoms whatever. In one of Bovaird's cases the spleen was one-sixth of the entire baby's weight, which shows why this symptom is so likely to attract attention. The patients are apparently well and some of them, my own case for instance, seem exceptionally strong and athletic and have great power of endurance. This boy thinks nothing of a thirty-five-mile canoe trip, and in fact is working particularly hard to reduce his waist line as it annoys him merely from the esthetic standpoint. So far as the blood is concerned there may or may not be an anemia. At certain stages the red cells may be as high as six millions. In my

case from repeated examinations in the last ten years the red blood cells have never been below four millions or the hemoglobin below 75 per cent. There is never any increase in the number of white blood cells, but there is occasionally a leukopenia. In the differential count the lymphocytes have been reported in some of the cases, and early in my case there was a relative increase in the lymphocytes when the boy was eleven or twelve years of age. There are now sixty-seven polynuclears and thirty-one lymphocytes. The prognosis is one of the most interesting phases of the disease since the patient usually dies of some intercurrent affection and not of the disease itself. Of the fourteen cases reported only three are said to have died of the disease, and in these three there is some doubt whether the disease itself actually killed. Of Collier's two fatal cases one was admitted to the hospital with bronchitis and enlarged spleen; and in the other death was hastened by an attack of "epistaxis and sickness." In Erdmann's and Moorhead's case the child died of pneumonia. Two have died after a splenectomy. The advisability of splenectomy is extremely doubtful since the liver continues to increase in size after the spleen is removed; the mortality of the operation is high; the disease evidently does not give the patient any discomfort, nor does it, in all probability, shorten life.

The patient which I present has been under my direct observation for ten years. He was born in New York City and is now twenty-one years of age. I saw him first at the age of eleven. His mother and father were then and are now in good health, there being nothing of interest in either branch of the family. The mother had no miscarriages. There were six children in the family. One died at the age of seventeen years of typhoid fever, having had a splenic enlargement for a number of years before his death, the cause of the enlargement of the spleen not being known to his mother. This boy went to a number of hospitals and dispensaries and all agreed that the spleen and liver were very large. Another child died of a disease said to be malaria, and two are living and well thirty-six and thirty-eight years of age respectively.

My patient came to me in December, 1906, because his abdomen was increasing abnormally in size like his brother's. At that time the physical examination was negative except for the enlargement of the spleen and liver. He was a boy of average size, although short in stature, with a round, rather fat face and lips a little thick. The tonsils were slightly enlarged, the heart and lungs negative. The upper border of the liver was at the sixth rib in the nipple line; the lower border was 2 inches below the costal margin. The spleen occupied the whole of the left half of the abdominal cavity as far as the umbilicus, extending down into the pelvis. The notch was plainly palpated. The glands were not enlarged. The physical examination otherwise was negative. The blood count showed 5000 reds, hemoglobin, 85 per cent.; 6000 white blood cells, 55 per cent. being lymphocytes, 30 per cent. polynuclears, 12 per cent. transitional, 3 per cent. eosinophiles. During the ten years that this boy has been under my direct observation we have made a great many blood examinations, usually two or three a year, and except

for the change in the differential count, that is, the increase in polynuclear leukocytes, the blood picture is exactly the same to-day. The last blood examination, November 4, 1916, shows 4,000,000 reds, 6000 leukocytes, 67 per cent. polynuclears, 31 per cent. lymphocytes and 2 per cent. transitionals. The Wassermann has been repeatedly negative including one taken November 1, 1916.

DR. GODFREY R. PISEK read a paper entitled

#### ACUTE MYELOGENOUS LEUKEMIA IN AN INFANT.

The blood diseases in early life and particularly the leukemias are still an unsolved problem. The leukemias are uncommon in children and the myelogenous variety is rare. Cassel in a series of 3000 autopsies found only two cases of leukemia during the first decade of life. The myelogenous variety is at least five times more rare than the lymphatic form. In a careful search of the literature, nineteen authentic cases of myelogenous leukemia were found, of which seven were less than two years of age. The case with the highest cell count is reported by Hutchinson; in this instance the white blood cells were 1,580,000 of which 59.3 per cent. were myelocytes. The case reported is of interest because of the tender age of the child, because it is of the myeloid variety and because of the autopsy findings.

This case was a baby, fourteen months of age who had been healthy until ten months old. The family history was negative. Five other children, ranging in age from seventeen to eight years of age were apparently healthy normal children. When ten months of age an eruption appeared on the child's face and the mother took him to the Essex Street Dispensary, where he was under treatment for three weeks, when the eruption disappeared. Two weeks later the infant fell from the arms of his sister and that evening the mother noticed a small lump on the child's face, on the right side near the ear. The following morning a similar lump was noticed in the upper right hypochondriac region. The mother then called in a physician who sent her to the dispensary. About this time the child began to have green stools, later streaked with blood. The mother took the child to Gouverneur Hospital where he remained for a week when she took him home for two weeks, at the end of which time he was brought to the Post-Graduate Hospital. The child was breast-fed but was apparently receiving also the regular family diet. At this time both ears were discharging profusely and there was swelling in the parotid region which had been present for a week and which steadily increased. The child was emaciated and prostrated, his color *café au lait*, the mucous membranes pale, and the musculature flabby. The anterior fontanelle was open, the eyes sunken, the lymph nodes enlarged in the cervical, axillary and inguinal regions, the abdomen distended, and there was a visible tumefaction over the left side. The nasal and aural discharge was purulent; the liver enlarged  $6\frac{1}{2}$  cm. below the free border; the spleen markedly enlarged to the crest of the ilium below and to within 2 cm. of the umbilical line.

The pus from a parotid abscess showed Gram-positive streptococci. The leukocytes numbered 118,000; polynuclear neutrophils 55 per cent.; lymphocytes 35 per cent.; large 10 per cent., and small 25 per cent.; myelocytes 20 per cent. The following day after the above count the red cells were 2,480,000 and hemoglobin 25 per cent. Two days after the first count the leukocytes had increased to 173,600 and the lymphocytes to 36 per cent. The myelocytes were  $6\frac{1}{2}$  per cent. of which the neutrophils were 6, basophils  $\frac{1}{2}$  per cent.; the erythroblasts were 3, normoblasts 2, and megaloblasts 1. Vomiting, diarrhea and prostration were the chief symptoms. The temperature varied from normal to  $101^{\circ}$  F. for five days and then rose to  $103^{\circ}$  and continued with marked remissions to rise to  $104^{\circ}$  F. on the last three days. Thirty-five c.c. of the mother's blood were injected without any apparent benefit. The patient died eleven days after admission to the hospital and the autopsy was performed three and one-half hours after death.

The autopsy findings showed that the abdominal cavity contained about 100 c.c. of a clear straw-colored fluid. The stomach was filled with gas and pushed downward below the umbilicus by the greatly enlarged liver which extended 8 cm. below the costal margin in the median line. The spleen was greatly enlarged extending downward to the brim of the pelvis. There was no increase of fluid in the thoracic cavity. The lungs were for the most part soft and aerated throughout. In the left was a nodule  $1\frac{1}{2}$  cm. in diameter in the upper lobe, which on section was found to be caseous in the center with a fibrous capsule surrounding. Several of the bronchial nodes were enlarged. The spleen was partially covered over with a white fibrous membrane which might be stripped off with slight difficulty. It was grayish red in color and rather firm in consistency. It weighed 260 grams. On section it was light bluish red in color and had a coarsely granular pulpy appearance. It was quite friable. In the gastrosplenic omentum was an oval body measuring  $5 \times 3 \times 2$  cm. which resembled splenic tissue and was probably a hyperplastic accessory spleen. The liver was motley yellowish red in color, smooth and rather firm in consistency.

On section it showed a fine mosaic structure of yellowish-red areas outlined by columns of deeper red which was probably due to a combination of congestion and fatty degeneration. The cortex of the kidneys appeared swollen. The external lymph nodes were palpable but not definitely enlarged. The bronchial nodes were moderately increased and the mesenteric glands were enlarged especially about the head of the pancreas. They were light yellowish red in color, rather soft in consistency and presented a structureless light red and friable cut surface. The bone marrow in the gross appeared congested and abundant in soft cellular material.

The microscopic examination showed a large caseous tubercle in the left lung, with numerous smaller tubercles surrounding it. There was considerable fibrosis of repair about the older tubercles, but judging from the presence of small apparently newly formed tubercles the process was still active. Examination of the spleen showed that the white cells were very numerous and consisted of poly-



morphonuclears, large mononuclears, and lymphocytes. The predominating cell as the large mononuclear type. The nuclei of the mononuclear cells were frequently kidney shaped and resembled those of myelocytes. The cytoplasm was fairly abundant and took a bluish-red stain, similar to that of the polymorphonuclear cells. In some instances a suggestion of granulation could be discerned, but it was not distinct. Rarely a nucleated red cell was found. While it was difficult to determine with certainty the exact nature and origin of the predominating cells, it seems highly probable that they were of the myelogenous type. The enlarged glands in the neighborhood of the spleen were almost identical in microscopic structure to the spleen and it is questionable whether they represent lymph nodes or accessory spleens.

The liver presented a very striking picture of an extreme capillary engorgement with myelocytic cells. The engorgement was more marked around the periphery of the lobules where many of the liver cells showed evidences of atrophy and fatty degeneration. Occasionally there was found a collection of myelocytes which had extravasated from the vessels, but most of them still remained within the capillaries. The percentage of myelocytes appeared to be greater in the capillaries of the liver than was counted in the blood. The kidneys presented a condition somewhat similar to that observed in the liver, but the engorgement was not so diffuse. The bone marrow taken from the shaft of the femur, ribs and vertebræ all presented a similar picture. The result of the microscopic examination was as follows: Splenomegaly; leukoblastic hyperplasia of the bone marrow; enlargement of the abdominal lymph nodes; engorgement and enlargement of liver and kidneys with myelocytic cells, and congestion and engorgement of the lungs.

In closing Dr. Pisek stated that careful blood examinations alone enabled one to classify these conditions and the prognosis had thus far been uninfluenced by the use of the  $x$ -ray, salvarsan, or atoxyl. Possibly serial injections and repeated injections of homologous blood might be of value particularly in cases in which an early diagnosis was made.

DR. L. T. LEWALD.—I would like to know whether the Röntgen ray findings in myelogenous leukemia bear any relationship to those found in chloroma. The findings in chloroma, both in the bone, medulla and the cortex, seem to be quite characteristic. I would like to know whether this case of Dr. Pisek's was submitted to a röntgenographic examination, and if so what the findings in the bones were.

DR. PISEK.—I do not know what the  $x$ -ray findings were in this case. We did not make any attempt to find them. The disease is so rare that I think we should follow out every avenue of research in the future. That there is any relationship to chloroma does not seem probable.

## DISCUSSION.

DR. ELIAS H. BARTLEY.—We had a case of myelogenous leukemia recently at the Long Island College Hospital in which x-ray examination was made, but it showed nothing. The autopsy gave very nearly the same picture as has just been described by Dr. Pisek. In our case the mesenteric glands were enlarged and looked like a bunch of grapes. We found nothing else aside from the microscopical picture. The history of this case was the usual history of all these cases; they go down grade rapidly and die. In our cases there were no petechial hemorrhages, but there was nose-bleed and gastrointestinal disturbance, but we did not know whether to attribute this gastrointestinal disturbance to the leukemia or to a severe ulcerative stomatitis. The patient's mouth had an extremely foul odor and the x-ray examination showed suppuration under many of the teeth. We thought that a great deal of the rapid decline was due to the suppuration in the mouth.

DR. BRENNAN.—Apropos of Dr. Pisek's case I would like to speak of a very interesting case of mine. A young boy came to my office with a tonsillitis and enlargement of the glands of the neck and inguinal region. The blood findings in this case gave the picture of myelogenous leukemia and on the following day there was enlargement of the complete superficial lymphatic system, so marked that it looked as though the boy had a general infection. His head had practically disappeared into his neck and his spleen and liver were greatly enlarged; by the end of fourteen days they entirely filled the abdomen; his girth increased from 20 to 39 inches and his spleen became palpable 9 cm. below the costal margin in the median line. The liver was a little lower. Iron and arsenic were administered but nothing did any good. The patient went down hill rapidly and died. We were unable to get an autopsy. At that time I suggested as a name for this disease malignant or fulminating leukemia. The blood count was 858,888 white cells, 98 per cent. mononuclear leukocytes, 0.7 per cent. myelocytes and eosinophiles, each 0.1 per cent.

Another case recently came under my observation which also started with tonsillitis. In this instance the patient complained of nothing particularly, but the skin exhibited a lemon green color. The blood only showed 17,400 white cells, about 3,000,000 red cells, hemoglobin 70 per cent. On October 23d he was attacked with severe nose-bleed which could not be controlled except by packing the posterior nares. We put in a Birney plug and we got a terrific necrosis of the mucous membrane of the nose. Every time we attempted to take out the plugging bleeding recurred. The blood count showed 50,000 white cells. The patient was treated by blood transfusion and after the third transfusion there was no enlargement of the glands in the axillary or inguinal region; only a few epitrochlear glands were still enlarged. The boy seemed to be absolutely comfortable and the blood picture was improving. Clinically we have done a great deal for him by the blood transfusions. Blood transfusion was now so simple that any physician

can use it and it was applicable to use in the home. This case was very interesting; everyone gave a different diagnosis, some said it was a leukemia and some that it was Hodgkin's disease.

DR. J. S. FERGUSON.—This case and the discussion both point to a possibility that has been in my mind for some time, suggested by cases of Hodgkin's disease, first in an adult and then in a child, viz., a possible relation of chronic infections to both myelogenous leukemia and to Hodgkin's disease. Dr. Pisek's case had no chronic infection except tuberculosis; it did show a tuberculous process in the lungs which gave evidence of recent activity. The case described by Dr. Bartley showed extensive suppuration in the mouth. In my cases simulating Hodgkin's disease I observed marked septic infection in the mouth. The case discussed by Dr. Brennan showed a possible infection through the tonsils.

One case in a boy of thirteen which I watched for some time had an extensive mouth infection and following the cleaning up of the mouth the glandular and splenic enlargements disappeared. The glands removed in this case showed tuberculous changes and a process appeared in the lungs which was so characteristic of tuberculosis both on physical and x-ray examinations that the x-ray plates were exhibited as showing a typical miliary tuberculosis. That boy improved under ordinary surgical treatment, first cleansing the mouth, then removing the grossly enlarged glands, and finally the usual treatment for tuberculosis which included the use of tuberculin.

I would not suggest that cases of myelogenous leukemia are necessarily related to tuberculosis, but it does not seem to me that if we regard the various types of adenoid and hematopoietic disease as having possible etiologic factors in suppurative and chronic infections of the body we will not be far amiss.

DR. HENRY DWIGHT CHAPIN read a paper entitled:

NEW YORK AS A PEDIATRIC CENTER.

Any community that aims to play a leading rôle in the advance of modern medicine must have a large population to draw from. Clinical observation, teaching and research all require abundant and varied material for purposes of study, demonstration and the sifting of results that may have been suggested by theoretical considerations. It is only as the laboratory is closely joined to the clinic that the most fruitful and lasting results will be obtained. Another factor is the wealth of the community. The commercial supremacy of New York is apt to cause its great importance in the manifold fields of art and science to be insufficiently appreciated. This is partly due to the fact that the city is so immense in area and population that it is somewhat lacking in community spirit. The absence of homogeneity in population is another case of this lack of community spirit.

The latest estimate of the Department of Health puts the population of New York City at 5,602,841 and the number of children under sixteen years of age at 1,699,901. This population is the most cosmopolitan of any city in the world. There is probably not a

strange or unusual race in the world that is not represented in this diversified population. As a fair proportion of the foreign population is poor, dependence is largely given to hospitals and dispensaries for diagnosis and treatment of diseases. This, of course, afforded abundant opportunity for a study of all kinds of maladies. The provision for the care of the sick poor in New York City is enormous. As the discussion was confined to children, consideration would be given to what was being done for them. There are in the city sixty-four hospitals that make more or less provision for the care of sick children. A few of these are devoted exclusively to the care of infants or older children, a few are devoted to special diseases, but most of them are general hospitals devoting some space to the medical and surgical diseases of children. An enormous amount of attention is now given in these various hospitals to the care of sick infants. An account of the beds that may be devoted to this purpose shows the astonishing number of 2469. In the orthopedic and contagious disease hospitals most of the beds are occupied by children, while in the eye and ear hospitals a goodly number are likewise devoted to this purpose. Dispensaries and out-patient clinics have no less than seventy-six departments for treating children.

There are thirteen asylums and homes for housing infants and little children. As the mortality is very high in these institutions a wide field for the study of pathology is thus offered. These facts show what a broad field New York offers for the study of pediatrics. The general death rate for 1915 was 13.93 per 1000 and the death rate under fifteen years was 14.68 per 1000 of the estimated population under fifteen years. Many factors doubtless contributed to this low mortality, but credit must be given to hospital management as affording some contribution to this result. It seems to show that the cases are often carefully studied and successfully treated. One may well be confused in contemplating such a diversity of riches as New York offers to the student of disease. There has been too little attempt at coöperation in an effort to coördinate these various sources of study. Every institution should do its best to make available all its resources to the serious student. As far as pediatrics is concerned, the staff of the Children's Department of the New York Post-Graduate Medical School and Hospital has tried to solve this problem by arranging a seminar lasting a month which aims to conserve the time of the physician with as complete a course as is possible under the circumstances. This seminar is arranged in four courses as follows: (a) Infant Feeding. (b) Dietetics in Older Children: Kitchen and Milk Analysis. (c) History taking in Gastrointestinal Diseases of Infancy; physical examination dealing with feeding cases only; instructions in writing directions, preparing food, etc.; various theories of infant feeding; percentage feeding; the top-milk method; the infant's digestive ability and need for fats, sugars and proteids, caloric value of the various foods and the requirements of the different classes of infants; number and quantity of feedings in twenty-four hours; feeding of new-born babies and of normal infants when the caloric requirements should not be fulfilled underfeeding and overfeeding; examination of stools; classification

of diarrheas; constipation; care of milk in the home; breast-feeding; indications for continuance or discontinuance. The Diet Kitchen of the Hospital is used to demonstrate the preparation bottling and care of the various infant foods together with milk analysis and adulteration:

(b) Feeding during the second year in normal and difficult cases; classification of foods; diet in nutritional disorders, such as rickets, scurvy, etc., diet in chronic or prolonged illness such as tuberculosis, nephritis, etc.; lavage and gavage.

Course II. (a) Laboratory work in Pediatrics. (b) Pediatric Technic on the Cadaver. (c) Hygiene in Infancy and Childhood. (a) Every effort was here made to correlate the ward and clinic cases with work in the laboratory. All the laboratory methods which might be of aid either in the diagnosis or treatment of children's diseases are studied. The various cutaneous reactions (von Pirquet, luetin, etc.) vaccines, the Wassermann reaction, immunity, metabolism, etc., in relation to children's disease are here considered. Methods of examining the blood, spinal fluid, sputum, urine and stools are next taken up. Examinations of the various throat cultures and smears for cases of vaginitis are also reviewed.

(b) Studies on the cadaver include surface anatomy, normal and abnormal; inspection of cranium, neck, throat, abdomen, spine and extremities; surgical procedures, such as intubation, tracheotomy, lumbar puncture, ventricular puncture, thoracentesis, paracentesis of membrana tympani, hydrocele, etc.

(c) Demonstration of proper clothes for infants and older children, the nursery, the bath, aerotherapy, ventilation, heating, exercises, amusements, hygiene of the baby's food and utensils.

Course III. (a) Physical Diagnosis. (b) Development and Correctional Exercises. (c) Contagious Diseases at the Willard Parker Hospital (a) This course is essentially clinical and aims to give the student a comprehensive knowledge of the present methods of examining and diagnosing the various diseases of infancy and childhood. It includes systematic examination of the infant and child in connection with diseases of the thorax, heart, kidneys, bones and joints, liver and gall-bladder, enlargements of the spleen, nervous diseases, diseases due to lack of internal secretions, tuberculous and congenital syphilis. (b) Many children although not suffering from orthopedic defects need systematic exercises and training for their general development. In this course special attention is paid to deep-breathing exercises, the correction of postural defects, increase in abdominal tone, exercises in cardiac conditions, etc. (c) Clinics in diphtheria, scarlet fever, measles are held at the Willard Parker Hospital.

Course IV. (a) Anatomy and Physiology of the normal child. (b) Practical Pediatrics. (c) Preventive Pediatrics. (d) Infant Mortality and Social Pediatrics. (a) This course consists of a thorough course in the anatomy and physiology of the normal child, including a study of the physiological development of the special senses. (b) This course consists of individual clinical teaching.

Patients are assigned to members of the class for examination and the diagnosis and possible treatment arrived at are discussed by the class. (c) It has been demonstrated that in pediatric practice prevention has its greatest application. This course is designed to present the modern methods in a practical manner. For example, prenatal oversight, the special care of premature infants, the prevention of common diseases, of communicable diseases, and of parasitic diseases are included in this study. (d) This course includes death rates in various communities, methods of registration, means of reducing the death rate, housing conditions, sanitation, eugenics, midwifery, nursing, and social service and education of mothers and young girls in the care of little children. Finally pediatric literature and the individual needs of the student are given a place in the plan of study.

There is no reason why an exchange of professors should not operate in large communities as well as nationally and internationally. The disorganization of university efforts in Europe should afford New York a chance to greatly enhance its opportunity for advanced work. With such advantages it should become the medical center of the world in almost all lines of effort. It might accomplish this great object if its professional leaders had the vision and would work together for such a promising future.

DR. MARSHALL C. PEASE read a paper entitled

CLINICAL CONDITIONS WHICH MAY BE ACCOMPANIED BY ACIDOSIS. A  
STUDY OF CASES WITH THEIR TREATMENT.

The term acidosis as generally used has merely indicated the presence of acetone in the urine. The assumption has been that these acetone bodies are very abnormal and signify an unusual complication, whereas, as a matter of fact, they appear at all times in small amounts in the urine and are apt to occur in children at some period in easily demonstrable amounts in most of the infectious diseases. Acidosis might be considered as the failure to normally regulate the normal processes. There is a continuous elaboration of many kinds of acids, such as sulphuric and carbonic in the body. These acids are normally neutralized or removed from the body so that the tissues and fluids are constantly of a definite degree of alkalinity. The normal preponderance of alkali over acids largely depends upon the maintenance of alkali reserve, which is very largely sodium bicarbonate. The production of large amounts of acids, such as those in the acetone series, if they were entirely or largely excreted without affecting alkali reserve will not result in acidosis. The same may be said of the acids that are capable of being neutralized by the alkalies of the food or by the ammonia made from urea. Acidosis results when the production of acids is so great that they cannot be neutralized without diminishing the reserve alkali. The normal preponderance of bases over acids is disturbed when the acids are produced in excess or when there is interference with their elimination.

The most striking symptom of acidosis, clinically speaking, is

an alteration in respiration, which becomes of the abdominal and costal type, the most noteworthy feature of which is the distinct effort that is involved and the increased amplitude. There is no evidence of obstruction or cyanosis. The object of the dyspnea is to increase ventilation. The necessity for increased ventilation is founded on an increasing tendency for a shifting of the reaction of the blood from normal alkalinity in the direction of acidity. In order to maintain the normal reaction of the blood there must be more rapid elimination of carbon dioxide, so that the carbon dioxide in the blood and therefore the carbon dioxide in the air of the alveoli of the lungs will be less than was normally present. In other words, the carbon dioxide tension or percentage is lowered. Consequently the simplest and easiest method of determining the presence or absence of acidosis is to measure the percentage of carbon dioxide in the blood or in the air of the alveoli of the lungs. In a series of thirty-seven cases the carbon dioxide tension of the blood gave not only a positive diagnosis but suggested the ultimate prognosis. In the few cases in which the carbon dioxide tension of the alveolar air has been made the findings have been quite as satisfactory as those in which the carbon dioxide blood tension was made. In a series of fourteen normal cases the average finding was 40 mm. and the variations above and below this figure was not over 5 mm. In the blood work the Van Slyke apparatus was used. In testing out the carbon dioxide tension of the alveolar air, Marriott's method was found very satisfactory. Marriott's apparatus is portable, takes only a very few moments to do, requires no special skill and is inexpensive. The van Slyke apparatus is a moderately expensive laboratory instrument, which calls for skill, in making the test and in getting the necessary amount of blood. It has not appeared that clinically there is any gain from the standpoint of diagnosis or of prognosis sufficient to make either method the method of choice.

An acidosis may be produced in three ways: (1) By the introduction of acids from the outside, as for instance through the alimentary tract; (2) by a failure in the excretory organs so that acids which are normally excreted are gradually accumulated in the blood stream and (3) an insufficient amount of alkali in the organism, perhaps as the result of abnormal loss of bases.

Probably the most common clinical condition in children which may be accompanied by acidosis is so-called food intoxication.

The symptoms of acidosis are first restlessness and sleeplessness which gradually changes to somnolence and finally to coma. Inspiration and expiration become more and more exaggerated, in order to increase the ventilation of the lungs, and finally develop into dyspnea of the "air hunger" type. There may be a small amount of sugar in the urine. Prostration is severe and there is evidence of an enormous loss of fluids. The death rate has been in the neighborhood of 80 per cent. The amount of actual diarrhea present bears no constant relation to the degree of acidosis. A prominent symptom of the onset is the severe vomiting which ceases

as the child passes into coma, and may or may not return as recovery takes place. Clinically the relation between this type of diarrhea and milk can be clearly traced, and the suspicion that the milk was stale is highly probable. A complete elimination of milk from the diet for days offers the most hope of ultimate recovery. The nourishment is supplied by the use of thick gruels and solutions of glucose. If conditions are not too desperate a period of starvation of twenty-four to twenty-eight hours would as a rule see the end of the acidosis, which might recur if even a small amount of milk was given. In connection with the suggestion that spoiled milk might be a cause of acidosis it might be observed that a large majority of the thirty-seven cases occur during the summer months and especially during particularly hot weather. High fat and sugar feeding result in diarrhea, but such diarrhea is not in any circumstances accompanied by acidosis, though they do make the child more susceptible to the conditions which result in acidosis. It is a question that has not yet been satisfactorily answered if this type of acidosis is not in reality a form of acute proteid indigestion since with the high proteid feeding of the present-day proteolytic processes become most prominent in the intestinal tract. Closely related to that form of acidosis which accompanies the above type of diarrhea is recurrent cyclic vomiting. While acetonuria appears very promptly in recurrent or cyclic vomiting not all of the cases exhibit definite symptoms of acidosis, in part probably the result of rapid compensatory excretion of acids and in part perhaps due to the vomiting itself. A period of starvation is likewise indicated in acidosis of this nature. A matter which has not received the attention it deserves, both in recurrent vomiting and ileocolitis with acidosis, is the frequent appearance of very large amounts of indican in the urine. This is often a transient finding which disappears, particularly if there has been vigorous treatment. A carbohydrate pack in the food does not seem to suggest itself as an etiological factor in either of these conditions. There are other less frequent conditions occurring in children which may be accompanied by acidosis, as diabetes and acute nephritis. In both the acidosis does not often manifest itself except as a terminal condition. Pneumonia is accompanied by a reduction in the carbon dioxide content of the blood, but the facts seem to have little if any relation to the severity or duration of the disease. This is a point that is worthy of further and more extended observation. The acetonuria which frequently follows anesthesia rarely results in a disturbance of respiration or in a lowered carbon dioxide tension, if our limited experience may be considered as any criterion. Extensive burns sometimes result in acidosis. The treatment of acidosis should be first a period of starvation and then the return to food should be to carbohydrate and the vegetable proteids, milk and broths being added very slowly and cautiously. The acidosis itself must be handled by neutralizing the acids. Sodium bicarbonate may be given by mouth, per rectum, intravenously and under the skin, in an amount sufficient to render the urine alkaline in reaction. If given under the skin



the sodium bicarbonate must be specially prepared. The solution may be sterilized and when cold carbon dioxide bubbled through it until the phenolphthalein which has been added is colorless. The solution for intravenous strength should be of 4 per cent. strength and from 75 to 100 c.c. should be given, according to the size of the child. By mouth from 10 to 15 grains of sodium bicarbonate may be given every three hours.

Dr. Pease exhibited the apparatus for collecting the alveolar air and estimating the carbon dioxide tension. The air was collected in a rubber bag such as used for inflating a football. A mask was prepared by cutting off the extreme end of a nipple of a wide-mouthed Hygeia bottle, which was fastened to the rubber bag by means of a glass tube and rubber tissue. (This apparatus was described in the *Journal of the American Medical Association*, May 20, 1916, p. 159.) The estimation of the carbon dioxide tension of the air was based upon the fact that if a current of air containing carbon dioxide was passed through a solution of sodium carbonate until the solution was saturated the final solution would contain sodium bicarbonate and dissolved carbon dioxide. The reaction of such a solution would depend on the relative amounts of alkaline bicarbonate and the acid carbon dioxide present. This in turn would depend on the tension of the carbon dioxide in the air with which the mixture had been saturated and would be independent of the volume of air blown through, provided saturation had once been attained. Low tensions had the reverse effect. The reaction of such a solution might be determined by adding to it an indicator, such as phenol-sulphonaphthalein, which showed over a considerable range of reaction definite color gradations.

Standardized phosphate mixtures, sealed in tubes, the standard bicarbonate solution, color comparison box and accessories, are now on the market in such a compact form that they are practical for bedside use and so simple that they may be employed by anyone.

DR. OSCAR M. SCHLOSS.—I have been interested in the subject of acidosis in infants during the past three years and have made a number of carbon dioxide determinations with various methods.

On Dr. La Fétra's service at Bellevue Hospital we have been using the apparatus described by Marriott for several months and have found it very useful and sufficiently accurate for all clinical purposes. It is the most simple method described and it has been used by the internes with perfectly satisfactory results.

It is due to the work of Howland and Marriott that acidosis has been shown to accompany the so-called alimentary intoxication, and the results which I have obtained with various methods are almost identical with theirs.

The only clinical sign which aids in the diagnosis of acidosis is the presence of increased pulmonary ventilation or hyperpnea. This, however, is not present constantly in all cases and it is only by means of one of the laboratory methods that the diagnosis can be made with certainty. The simplest and most accurate of these is the determination of the carbon dioxide of the alveolar air, or the

carbon dioxide combining power of blood plasma according to the method of Van Slyke.

As Dr. Pease mentioned the acidosis is best treated by means of sodium bicarbonate. The most satisfactory method of administration is by intravenous injection. I have found that it is only in this way that a prompt result can be secured. In most instances repeated injections are necessary and the number and frequency may be determined by the carbon dioxide estimations.

Despite the improvement which attends this treatment, a great number of these infants die. A few die from a recurrence of the acidosis but in most instances death is due to a severe malnutrition.

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## BRIEF OF CURRENT LITERATURE.

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### DISEASES OF CHILDREN.

**Acidosis in Children.**—A number of infants with severe diarrhea develop evidences of acidosis and the overwhelming majority of these die. The clinical evidence of the acidosis is hyperpnea. J. Howland and W. McK. Marriott (*Bull. Johns Hopk. Hosp.*, 1916, xxvii, 63) began their studies with the suggestion afforded by the hyperpnea. They found a low carbon-dioxide tension in the alveolar air. That this is due to acidosis is strongly indicated by the fact that bicarbonate of soda, given by mouth or intravenously, causes a return of the carbon-dioxide tension to normal or even abnormally high figures and to cessation of the dyspnea. They found a great tolerance for alkali, so that relatively large amounts of bicarbonate of soda must be administered in order to change the reaction of the urine. They determined directly the reaction of the blood by the indicator method, and found in all the severe cases a distinct shifting of the reaction in the direction of acidity. This reaction may again become normal after alkalies have been given in sufficient quantity. And finally, they obtained evidence of an alteration in the reaction of the blood, by determining a great lowering of the combining power of the hemoglobin for oxygen. They say that acidosis is not an uncommon condition in infancy and childhood; that while it is especially frequent in the severe diarrheas of infancy, it may appear with a variety of diseases, and sometimes, apparently, alone. To recognize it with older children is not very difficult. The character of the respiration is usually sufficient to arrest one's attention and one or two relatively simple laboratory tests will quickly determine the question one way or the other. With infants who are irritable, restless and crying, it is much more difficult to say whether hyperpnea is present; and yet with them it is most important to make the diagnosis early, for the reason that acidosis is such a fatal complication of diarrheal disease in infancy. Older children react promptly and often permanently to alkali therapy. It may be possible to stop the clinical and laboratory evidences of acidosis in infants, but the

patients usually die. Why they do cannot be determined at the present time. Many normal processes have undoubtedly been inhibited, perhaps permanently, and many abnormal ones stimulated. A restoration to normal conditions seems nearly impossible. For this reason we should not wait until acidosis can be demonstrated. From the beginning we should give bicarbonate of soda to infants with severe diarrhea in sufficient quantity to render the urine alkaline and keep it so. We may lay it down as a general maxim that as hyperpnea indicates acidosis, so hyperpnea indicates alkali therapy, and this for infants or older children. The alkalies may be given by mouth, by rectum, subcutaneously or intravenously. Vomiting and diarrhea frequently render their administration by mouth or by rectum out of the question. Then one of the other methods must be employed. Intravenous administration is the method of choice, especially when rapidity of action is desired—and with acidosis rapidity of action is always desired. If facilities for the intravenous injection of alkali are not at hand, the injection may be made subcutaneously, with care that the bicarbonate has not been transformed into the carbonate, else severe sloughing of the tissues may result. A 4 per cent. solution is usually employed for intravenous use and a 2 per cent. solution for subcutaneous use. The quantity to be injected depends upon the size of the child, the severity of the symptoms and the effect produced, but the amount is always large. It must be given until the urine becomes alkaline; even in infants under one year, as much as 10 grams in twenty-four hours may be required. With the cases of acetone-body acidosis with no sugar in the urine and with a low sugar content of the blood, glucose by rectum, subcutaneously or intravenously seems clearly indicated in addition to the alkali. With all forms water is urgently required, especially with infants who are desiccated as a result of the vomiting and diarrhea.

**Recurrent Hilus Infiltration.**—The form of tuberculosis of which two cases are reported by H. Wessler and M. H. Bass (*Amer. Jour. Dis. Child.*, 1916, xi, 198) is one of direct extension from the lymph nodes and occurs frequently enough to warrant its consideration as a clinical entity. This lesion occurs in the vast majority of cases on the right side and its point of predilection is the lung in the immediate vicinity of the fissure between the upper and middle lobes. Beginning with its base at the hilus, where a dark shadow of tuberculous nodes is visible, a fairly opaque shadow of homogenous density extends outward into the lung for a considerable distance, gradually fading into the normal lung tissue. The resulting infiltration is triangular in shape, its apex near the axilla. Its lower margin is sharply limited by the interlobar fissure. The latter is evidently thickened and is the seat of a pleurisy. These shadows have been assumed by Eisler to be to a great extent due to pleurisy in and about the interlobar fissure, resulting from a primary tuberculous focus in the sense of Ghon, which is so frequently found at necropsy in this situation. Sluka, with greater plausibility, believes that it is a direct infection of the pulmonary tissue from the caseated lymph

nodes at the hilus with a resulting tuberculous infiltration of the lung. The infiltration does not remain constant in size or appearance; and this is perhaps the most remarkable fact in regard to these cases. The Röntgen examination made at intervals of a month may show at first a wide area of infiltration and at the later examination, nothing may be left but the thickened interlobar fissure. The latter usually persists for a long time as a thin, sharp line running horizontally across the upper part of the right lung from the inner end of the fourth costosternal junction to the axilla. Such a sequence of infiltrated and normal lung may be repeated several times, and justifies the appellation of "recurrent hilus tuberculosis," and finds its correspondence in the signs and symptoms. Tuberculosis of the bronchial lymph nodes may give rise to the form of infiltration described or to an interlobar pleuritis or to both. The pleuritis may occur alone and give rise to a similar group of symptoms. Röntgen-ray examination is therefore absolutely necessary to differentiate between the two conditions. Children in whom this typical hilus involvement has been found are usually seen on account of general debility, loss of weight, slight cough or night sweats. The condition is found between the ages of two and eight years, not in infancy. Physical examination of the chest is usually negative. This emphasizes the fact that in such debilitated children with positive von Pirquet test, Röntgen-ray examination is imperative. This is all the more necessary since it has been shown that this particular lesion is in many cases a curable one, provided appropriate treatment is followed. The clinical picture of these cases is peculiar, in that it shows considerable variation in the same case at different times. There is apparently a recurrent inflammatory process, which as it extends from the hilus into the lungs produces an exacerbation of the clinical signs and symptoms. During such exacerbations the Röntgen ray reveals the extension into the lung fields as described above. In favorable cases, the majority seem to be of this type, there is a distinct regression, the symptoms all becoming much milder, and the Röntgen ray coincidentally showing a diminution in the amount of lung involvement.

**Rapid Method for Determination of Fat in Feces.**—A prime necessity in the study and treatment of cases of fat intolerance is a rapid and easy method for the determination of the feces fat so that necessary changes in the diet may be made promptly. By means of the nephelometric principle, which has been used by Bloor for the determination of the fat in blood and milk, it has been found possible by C. H. Laws and W. R. Bloor (*Amer. Jour. Dis. Child.*, 1916, xi, 229) to make an accurate determination of the fat in the stools in about one hour. The method consists essentially in extracting directly with acidified alcohol and ether, filtering the extract, then precipitating the fat in a watery solution and comparing the cloudy suspension so obtained with that of a similarly prepared standard solution. The writer describes the technic of this procedure, which gives consistent results to within 5 per cent. of the results obtained by the older methods, and is, therefore, adequate for all clinical purposes.

**Diphtheria Toxin Skin Reaction.**—The investigations of H. Koplik and L. J. Unger (*Jour. A. M. A.*, 1916, lxvi, 1195) showed that if the toxin injected approximated one-fiftieth of the minimal lethal dose rather than accurately equaled that amount, all the indications of the test were met. They, therefore, devised a needle for this purpose. The technic of their method is as follows: After an area of skin on the forearm has been cleansed with alcohol, the latter is encircled by the thumb and index-finger, and the skin held tense between them. The needle is dipped into the bottle of pure undiluted diphtheria toxin and then *immediately* inserted *intradermally*. The needle is an ordinary hypodermic bent at a distance of  $\frac{1}{4}$  inch from its point so as to make an angle of about 170 degrees. The angle aids in inserting the needle intradermally. From the place of bending to the distal end it is shielded so that only the unshielded  $\frac{1}{4}$  inch can be inserted into the skin. The needle is so constructed that when it is inserted its full length the amount of toxin carried in is approximately one-fiftieth of the minimal lethal dose. This technic is practically painless; it obviates diluting the toxin, thereby eliminating the paraphernalia needed for this purpose. The pure toxin kept on ice retains its potency for one year. The diluted toxin used in the Schick technic deteriorates in twenty-four hours. Another very important advantage is the reduction of pseudo-reactions to a minimum. In all the cases tested the original Schick technic was used as a control on the right arm, while the technic described was used on the left. The tests were studied twenty-four, forty-eight and seventy-two hours after the injection. The results were as follows: 1. Every case positive by the Schick technic was positive by this one. 2. Every case negative by the Schick technic was negative by this. 3. The traumatic pseudopositive reactions, which appear to be positive by the Schick technic although really negative, were negative by this. 4. Of the anaphylactic pseudopositive reactions, which appear to be positive by the Schick technic although really negative, 75 per cent. were eliminated.

**Operative Treatment of Brachial Plexus Paralysis.**—Emphasizing the advisability of early diagnosis and anastomosis and repair of the injured brachial plexus, with the knowledge that unless the injured nerve roots of the plexus are so treated a normal arm cannot be obtained, whereas with the operation at an early date, the child has the chance of obtaining a useful arm or at least an improved arm, W. Sharpe (*Jour. A. M. A.*, 1916, lxvi, 876) says that in cases of total paralysis of the arms, he advises exposure of the plexus at one month of age for several reasons: 1. The child will stand the operation at that age better than at an earlier date, and as well as at any time several months later. Little if any anesthesia need be used at one month of age, and, in most operations on children under one year of age, the danger of the anesthetic is the greater risk. 2. The earlier the anastomosis of the nerve roots, the more perfect the union of the nerve fibers and consequently a greater improvement ultimately. 3. The earlier the operation, the less the formation of fibrous tissue, so that the operation of plexus exposure and nerve

anastomosis is less difficult technically. The surrounding connective tissue resulting from the rupture of the plexus and the neighboring tissues with the associated hemorrhage of varying degree, and so forming the future scar tissue, can at this early date be dissected away with comparative ease and safety. Less resection of the nerve ends is necessary to remove the fibrous tissue formation and future scar tissue within the nerve sheaths, the most frequent cause of poor results. 4. There is little or no retraction of the nerve ends at the age of one month, whereas, months later, the distal nerve roots may be retracted downward even beneath the clavicle, while in the less severe cases, the ends may be buried in the surrounding tissues, requiring much patience, time and dissection to free them or even find them. The oldest patient operated on for a brachial birth palsy was fourteen years of age; the condition improved, but a good arm was not obtained. The children operated on at three months of age have made excellent recoveries; this is due partly to the fact that in them there was not a complete tear of all of the roots of the plexus, whereas, in the children operated on at one month of age, the plexus had been practically torn apart in that the arm, hand or fingers could not be moved at all, and thus the nerve lesion was always a more severe one. About half of these children operated on at one month of age, however, have shown a marked improvement; in four it may be possible to obtain a normal arm. As a rule, the children operated on at three months of age have shown a more constant improvement; and yet, if they had been operated on at one month of age, a greater ultimate improvement would have occurred.

**D'Espine's Sign in Childhood.**—Because of the difference of opinion which prevails as to what constitutes d'Espine's sign, J. L. Morse (*Amer. Jour. Dis. Child.*, 1916, xi, 276) investigated a series of 666 private cases. In 626 of these children, or 94 per cent., the change in the voice sound occurred between the seventh cervical and the first dorsal spine. The following conclusions seem warranted from the study of these cases: D'Espine was correct in his original contention that the normal change in the voice occurs between the seventh cervical and the first dorsal spines. D'Espine's sign is present, therefore, when the bronchial voice, or whisper, is heard below the seventh cervical spine. D'Espine's sign is uncommon in children of the well-to-do classes. When it is present in them, it is probably not a manifestation of tuberculosis in more than 50 per cent. The presence of this sign means merely that there is some tissue between the trachea and bronchi and the vertebral column which transmits the bronchial sound unchanged, whereas under normal conditions it is modified during its transmission. This tissue is ordinarily made up of the enlarged tracheobronchial lymph nodes. The enlargement of these nodes may or may not be due to tuberculosis.

**Value of the Luetin Reaction in Congenital Syphilis.**—The results obtained by M. B. Gordon (*Arch. Pediat.*, 1916, xxxiii, 186) in a series of twenty-two congenital syphilitic and twenty-two non-syphilitic children are in accord with those obtained by other inves-

tigators as to the reliability of the luetin reaction in congenital syphilis. The reaction was present in 81 per cent. of the cases of congenital syphilis and was absent in all nonsyphilitic cases but one. This test is more adapted for pediatric work than the Wassermann. It is especially more so in dispensary work, where it sometimes is almost impossible to obtain permission from the parents to draw blood from a child. It is especially valuable in those cases where all knowledge of any venereal infection is denied, or even where it was never suspected.

**Diagnosis of Appendicitis in Childhood.**—In conjunction with a history of intermittent constipation, the presence of a slight rise in temperature, and complaints of pain in the right lower quadrant of the abdomen, F. L. Wachenheim (*Arch. Pediat.*, 1916, xxiii, 197) regards as the most valuable sign of appendicitis, whenever it can be elicited, tenderness and pain in the McBurney region upon high palpation of the right iliac fossa per rectum. If the finger is introduced carefully the patient complains of no discomfort, until the introduced finger reaches the right iliac fossa, when the child complains of a sharp pain in the neighborhood of McBurney's point. Asking the child to point out the site of the pain, if due to a rough introduction of the finger, the patient will invariably point to the anus, if appendicular, it will always be correctly localized, provided the intelligence of the child is adequate, as after the age of eight years, and often much earlier.

**Ketones and Betahydroxybutyric Acid in the Urine of Normal Children.**—A number of urines were studied by B. S. Veeder and M. R. Johnston (*Amer. Jour. Dis. Child.*, 1916, xi, 291) to determine whether or not ketones and betahydroxybutyric acid were present, and if so, in what quantities. The method used for determining their presence was that of Shaffer, in which the acetone and the acetoacetic acid are first distilled over, and then the betahydroxybutyric acid oxidized by potassium bichromate and distilled over as acetone. The amount of acetone is then determined by the iodimetric method of Messinger. The twenty-one children from whom the twenty-four-hour specimens examined were obtained were what is usually termed "normal" with a few exceptions. Small amounts of ketones and betahydroxybutyric were always found in the urines of these normal children when their caloric requirements were fully covered by the diet. The amount was small and varied from 20 to 100 milligrams in terms of acetone in twenty-four hours. The average amount excreted was from 50 to 80 milligrams. The age, sex, and body weight of the child apparently had no effect on the amount. As a rule, the amount of betahydroxybutyric acid was somewhat greater than the amount of ketones, but this did not always hold true. We must regard these substances as present in small amounts in the urine of normal children. The large quantity of "acetone bodies" in the urine in febrile conditions and on restricted diets is due to the increase of substances normally present, rather than to the appearance of abnormal substances.

**Pseudoreaction in the Schick Test and its Control.**—The pseudoreaction is caused, says A. Zingher (*Jour. A. M. A.*, 1916, lxvi, 1617), not by the soluble diphtheria toxin, but by the protein substance of the diphtheria bacillus which is present in the solution used for the test. The reaction may be obtained in individuals who have enough natural antitoxin to render them immune to diphtheria. It is important, therefore, to control these pseudoreactions, which are quite frequent in the adult, especially women (from 20 to 30 per cent.), but relatively rare in children. These control tests may be made after the reaction with the regular Schick test has developed, or, especially in the adult, the two tests may be made simultaneously, one on each forearm, and the clinical course of the reactions thus compared. For the Schick test, the bureau of laboratories of the health department of New York City is supplying an outfit which contains carefully measured amounts of undiluted diphtheria toxin. This outfit consists of a capillary tube which contains a little over one minimum lethal dose of a ripened diphtheria toxin, a small rubber bulb for expelling the toxin, and a 10 c.c. bottle of normal saline solution for diluting the toxin. Every 0.2 c.c. of the dilution represents one fiftieth minimum lethal dose, the amount used in the Schick test. The outfit for controlling the positive, pseudo and combined reactions is similar to the Schick test outfit, but the toxin in the capillary tube has been heated to 75° C. (167° F.) for five minutes. Heating the toxin at this temperature destroys the soluble diphtheria toxin, but does not appreciably affect the protein of the diphtheria bacillus. In an individual who gave a *positive* reaction only, the control test with the heated toxin will be negative. In one who gave a *pseudoreaction*, the control reaction will be of about the same size and appearance, and pass through the same clinical course as the original reaction; *e.g.*, the two reactions showing a similar central area of redness of varying size, surrounded by a secondary areola which shades off into the surrounding skin. Both reactions begin to appear in about six to eighteen hours, reach their height in twenty-four to thirty-six hours and disappear in three to four days, leaving a poorly defined area of pigmentation and generally no scaling. In an individual who gave a *combined* reaction in the original test, both the positive and the pseudoreaction may be detected. The positive reaction becomes manifest in the original test at the end of three to four days, when the pseudoelement of the reaction has disappeared, as a definite circumscribed area of redness, which measures from 1 to 2.5 cm. in diameter and shows superficial scaling with beginning brownish pigmentation. The pseudoreaction is detected in the control test with the heated toxin; the reaction will not be as marked as in the original Schick test, but passes through the typical clinical course of a false reaction.



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EDITORS

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## ORIGINAL COMMUNICATIONS.

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### COMPLEMENT-FIXATION IN ABORTIONS OF WOMEN, WITH SPECIAL REFERENCE TO THE B. ABORTUS (BANG) AND THE B. ABORTIVO-EQUINUS.\*

BY

PHILIP F. WILLIAMS, M. D., AND JOHN A. KOLMER, M. D.  
Philadelphia.

THE economic importance of premature interruption of pregnancy has led to a study of its etiology from many standpoints. From the many investigations that have been made we now consider the influences resulting in abortion or premature labor to include systemic disease or infection, local pathological conditions of the pelvic organs which interfere with the continued nourishment of the ovum, and injuries or overexertion which mechanically cause a separation of the fetus or its membranes from the uterus. Of the systemic infections, syphilis, for many years, has been held to be responsible for a large percentage of abortions. Since the advent of the Wassermann reaction and a study of abortions by this test the number of syphilitics among aborting women has been found to be surprisingly low. Syphilis is the cause of the majority of stillbirths, premature and at term, but plays no similar rôle in interrupting pregnancy in the early months. Certain occupational diseases of the husband as plumbism and phosphorus poisoning have been mentioned as constitutional causes. Locally, malpositions of the uterus, especially retrodisplacements, and diseases of the endometrium, particularly gonococcus infection of the endometrium are probably the factors most frequently responsible. While injuries, as falls, and overexertion may

\* From the Department of Obstetrics, Hospital of the University of Pennsylvania, and the Laboratories of the Philadelphia Polyclinic.

Read before the Obstetrical Society of Philadelphia, October 5, 1916.

play a part, the most frequent traumatic cause is undoubtedly criminal interference.

In a recent study we had occasion to study the Wassermann reaction with the blood of aborting women and women who had had repeated or habitual abortions(1). In view of the number of positive reactions obtained in the first class, 20 per cent., and 45 per cent. in those who gave a history of repeated abortions we determined to carry on an investigation of the serum reactions in the blood of aborting women, and in addition to the Wassermann reaction to include the gonococcus complement-fixation test and complement-fixation tests using as antigens preparations of the *Bacillus abortus* (Bang) and the *Bacillus abortivo-equinus*.

It may be well at this point to discuss briefly the conditions produced by these bacilli. Infectious, or epidemic, abortion in cattle(2) has been recognized by stockmen for many years. Its contagious nature was known long before the means were at hand to discover the cause. It was not until 1895 that Bang(3), a Danish bacteriologist, isolated the organism which now bears his name from the uterine exudate and aborted fetus of an infected cow. The disease is common in both Europe and America and the economic loss is severe. Cattle may be infected by means of the bull or by the alimentary canal. The bacillus travels to the uterus by the blood-vessels and lymphatics, causes an exudate between the uterine wall and fetal membranes, resulting in death and expulsion of the fetus. From the discharged uterine contents the bacillus may be recovered by appropriate means of culture. Cows usually abort about the fifth or sixth month. Not every cow which is infected will abort, this may be due to an acquired immunity or because the abortion is only a symptom of the disease. Aside from the abortion there are no well-marked symptoms of the infection. For diagnosis the agglutination test and the complement-fixation reaction using preparations of the *B. abortus* (Bang) as antigen are used, the latter having proven accurate and highly specific.

Infectious abortion in mares and jennets(4) is a disease quite comparable to infectious abortion in cattle. It is caused by an organism of entirely different characteristics, however, a member of the intermediate group of the colon-typhoid group, which has been named the *B. abortivo-equinus*. This organism has been recovered from the various internal organs of aborted colts, the after-birth and uterine exudate of aborting mares and jennets. There are more marked changes in the after-birth and internal fetal organs of aborting mares than is the case in aborting cows. It may be re-



marked at this point that Teacher(5) who observed an epidemic of abortions in guinea-pigs has called attention to changes in the after-births which he has compared to the white infarctions of the human placenta. The diagnosis of infection in mares has been made by means of the agglutination and complement-fixation reactions using preparations of the *B. abortivo-equinus* as antigen, with highly satisfactory results. Animal experiments have fulfilled the postulates of Koch for both these conditions. In all varieties of laboratory animals and in most of the larger domestic animals abortion has been produced by the injection of cultures of both *B. abortus* (Bang) and *B. abortivo-equinus*.

The importance of *B. abortus* (Bang) from the human standpoint lies in the fact that this organism is frequently present in milk from an infected cow. This fact was discovered by Schroeder and Cotton(6) while testing milk for tubercle bacilli. They found that guinea-pigs injected with milk from a cow in which tuberculosis was suspected developed lesions in the liver, spleen and other organs which resembled tubercles. A bacteriological study of the lesions showed that the causative organism was the *B. abortus* (Bang). This finding led to a study of market milk with rather surprising results. They found the *B. abortus* (Bang) in over 11 per cent. of seventy-seven samples of market milk and in the milk distributed by six out of thirty-one dairies. In a test of single samples of milk from 140 dairy cows in the District of Columbia the bacillus was found in nineteen. Later Schroeder(7) found the milk from twenty-nine of ninety dairies was infected. Fabyan(8) obtained a positive result in 10 per cent. of samples of milk from apparently healthy cows. He obtained the organism in the milk of a cow which had calved eleven months previously, showing that milk furnishes a medium in which the bacillus may multiply over long periods of time.

The presence of the organism in so large a percentage of samples of market milk raised the question as to whether or not the ingestion of such infected food might have a deleterious effect upon the human body. Some work along this line has been reported. Mohler and Traum(2) using the agglutination and complement-fixation reactions, which are highly specific in cattle, found no positive reactions in an examination of forty-two human sera. Larson and Sedgwick(9, 10) using the complement-fixation test with the *B. abortus* (Bang) as antigen obtained 17 per cent. positive results in the sera of 425 children and infants. These children were for the most part upon a diet in which milk played a prominent part, and it is interest-

ing to note that they obtained a negative result upon the serum of a baby entirely breast-fed. As to the possibility of infection in adults it is believed that they would be less susceptible, as the mucous membrane of the gastrointestinal tract of adults is less penetrable than that of a young child. However, Cooledge(11) has been able to demonstrate antibodies in the blood of adults by feeding a milk which contained the *B. abortus* (Bang) and its antibodies. This is considered as a passive immunity to the bacillus due to the absorption in the intestine of the antibodies present in the infected milk. Larson and Sedgwick(9) report instances of women aborting during the time there was an epidemic of abortion among the cattle on their farms in whose cases no definite cause for the abortion could be found. These cases while not conclusive certainly seem suggestive that human infection could have taken place. These authors also state, no data being given, that in examining the serum from aborting women they have obtained a larger number of positive complement-fixation tests when the *B. abortus* (Bang) was used as antigen than with the ordinary syphilitic antigens. Nicoll and Pratt(12) tested the blood of a woman, who had a seven months' miscarriage, for evidence of infection by this organism. Using the agglutination test with the *B. abortus* (Bang) they found her serum gave a positive reaction with dilutions up to 1 to 300, five months later it reacted only at a dilution of 1 to 100.

We have confined our study to an examination of the sera of fifty women who had recently interrupted pregnancies, the majority being abortions in the first three months of pregnancy. In addition we tested the blood of seventeen men and nonpregnant women as controls. Each of these sera has been subjected to four complement-fixation tests. The first, for syphilis, using a cholesterinized extract of human heart as antigen; the second, for evidence of gonorrheal infection, using a polyvalent antigen of gonococci; the third, using a polyvalent antigen of *B. abortus* (Bang) to determine the presence in the serum of any antibodies to this organism; and fourth using a polyvalent antigen of *B. abortivo-equinus*. In addition we have performed the agglutination test with twelve sera. We have used the complement-fixation test on account of its high specificity in the diagnosis of infectious abortion in cattle and mares. In all instances the clinical histories of the aborting women have been carefully investigated as to the possibility of syphilitic or gonorrheal infection, pelvic pathology, injuries, occupation of the husband, and the source of the milk supply. We have tried to exclude all cases due to interference. Consequently we believe

that for the most part these cases represent the apparently natural or spontaneous abortion most comparable to the symptomatic abortion of infected cattle.

#### TECHNIC.

**Antigens.**<sup>1</sup>—The antigen of *B. abortus* (Bang) was prepared by growing twelve strains on a solid medium, removing the growths with sufficient normal saline solution to give an emulsion of about two billion bacteria per cubic centimeter. The emulsion was mechanically shaken for twenty-four hours, heated at 60° C. for one hour and preserved with 0.5 per cent. phenol. The antigen of *B. abortivo-equinus* was prepared of nine strains in the same manner as described.

In the gonococcus complement-fixation test the antigen prepared and marketed by Parke, Davis and Co. was employed.

All the bacterial antigens were titrated before the complement-fixation tests, and used in doses ranging from one-half to one-third the anticomplementary dose. The results of a single set of these titrations are shown in Table I.

TABLE I.—ANTICOMPLEMENTARY TITRATIONS.

Dose, c.c.	Antigens			
	<i>B. abortus</i> (Bang)	<i>B. abortivo-equinus</i>	Gonococcus 1 to 10	Cholesterinised heart. 1 to 20
0.2	H*	H	H	H
0.4	H	H	H	H
0.6	SIH	H	H	H
0.8	MIH	H	H	H
1.0	IH	SIH	SIH	H
1.5	IH	MIH	MIH	SIH
Dose used.....	0.15	0.3	0.3	0.1 c.c.

\*H = Complete hemolysis.

SIH = Slight inhibition of hemolysis.

MIH = Marked inhibition of hemolysis.

IH = Complete inhibition of hemolysis.

<sup>1</sup> We beg to express our thanks to Dr. Malcolm J. Harkins, Glenolden, Pa., for the strains of *B. abortus* (Bang) and *B. abortivo-equinus* used in this study.

TABLE II.—ANTIGENIC TITRATIONS.  
With Serum of Cow No. 9 Infected with *B. abortus* (Bang).

Dose of immune serum, c.c.*	Antigens	
	<i>B. abortus</i> (Bang)	<i>B. abortivo-equinus</i>
.001	**	***
.005	†	—
.02	†††	—
.01	††††	—
.05	††††	—
.1	††††	†
.2	††††	†
.2 control	—	—

\* Serum heated at 56° C. for one-half hour.

\*\* = Complete hemolysis.

† = Less than 25 per cent. inhibition of hemolysis.

‡ = 25 per cent. inhibition of hemolysis.

†† = 50 per cent. inhibition of hemolysis.

††† = 75 per cent. inhibition of hemolysis.

†††† = 100 per cent. inhibition of hemolysis.

\*\*\* As shown in these titrations well marked fixation of complement occurred only with the antigen of *B. abortus* (Bang), with which the cow was infected; the absence of fixation with the antigen of *B. abortivo-equinus* indicates that these microorganisms are not closely related biologically. Similar results were observed with the serum of cow No. 10. (See Table III.)

As shown in Tables II and III the antigenic sensitiveness of the *B. abortus* antigens is indicated by the marked degree of complement-fixation observed with the serums of infected cows.

The alcoholic extract of human heart reinforced with cholesterin was used in doses of 0.2 c.c. of a 1 to 20 dilution, which amount was twenty times less than the anticomplementary unit of this extract.

*Sera.*—All sera were inactivated in the water-bath at 56° C. for one-half hour, and used in doses of 0.2 c.c. with all antigens.

*Hemolytic System.*—All the work was conducted with the anti-sheep hemolytic system, using two units of hemolysin in the titration and complement-fixation tests.

The results of the complement-fixation tests were read and



recorded immediately after the secondary period of incubation, when complete hemolysis of the controls had occurred.

*Agglutination Tests.*—Sera were diluted with sufficient saline solution that when 1 c.c. of the emulsion of *B. abortus* (Bang) used in the complement-fixation tests was added, the dilutions of the sera ranged from 1 to 10 to 1 to 80. After a two-hour period of incubation at 37° C., a preliminary reading was made. The sera were then placed in the ice-box for twenty-four hours after which the final reading was made.

#### RESULTS.

*Syphilis.*—In this series of fifty cases positive Wassermann reactions were observed with the sera of four, or 8 per cent. Brief histories of these cases are as follows:

S. S., white, aged twenty-six years, married. Abortion at second month, five previous pregnancies resulted in two stillbirths, at six and seven months, and three abortions.

K. K., white, aged twenty-four years, married. Abortion at second month, three previous pregnancies resulted in abortions.

J. J., black, aged twenty-one years, married. Stillbirth at seventh month. No previous pregnancies.

F. F., white, aged twenty-four years, married. Miscarriage at fifth month. Previous pregnancy resulted in birth of live child at term.

As previously stated all of these Wassermann reactions were conducted with an alcoholic extract of heart reënforced with cholesterol. In our experience these extracts constitute the most delicate antigens in the Wassermann reaction with which we are familiar (1, 13, 14), and this is an advantage and particularly so in the diagnosis of latent syphilis, to which group these women belong, when the quantity of syphilis "reagin" is likely to be small. A more delicate technic as employed in the Hecht-Gradwohl reaction will aid in the diagnosis of even a larger percentage of persons in the latent stages of syphilis (15). In the specific treatment of these persons the Wassermann reaction conducted with a cholesterolized antigen and the Hecht-Gradwohl control test, constitute the most delicate serological guides, and treatment should be continued until the complement-fixation reactions remain negative for a period of at least two years. In our opinion it is a serious error to discontinue treatment on the basis of a negative Wassermann reaction with an alcoholic extract of syphilitic liver as antigen, as these extracts are not sufficiently delicate. With suitable and properly standardized cholesterolized extracts the likelihood of obtaining pseudo- or falsely positive reactions as described by one of us

(Kolmer(13)) is almost negligible and with continued experience our confidence in these antigens has steadily increased.

*Gonococcus Infections.*—In this series of cases positive complement-fixation reactions with a gonococcus antigen were observed with the sera of six, or about 12 per cent. One patient in this group had a positive Wassermann reaction as well. Brief histories of these cases were as follows:

K. K., white, aged twenty-four years, married, abortion at second month. Three previous pregnancies ended in abortions. Positive Wassermann.

P. P., white, aged twenty-four years, married. Abortion at second month, first pregnancy.

C. C., black, aged twenty-six years, married. Abortion at fourth month. Two previous pregnancies resulted in three children, one still-birth, and seven abortions.

S. S., white, aged thirty-four years, married. Abortion at seven weeks. Previous pregnancy resulted in birth of live child at term.

B. B., white, aged thirty-one years, married. Abortion at second month, first pregnancy.

O. O., white, aged seventeen years, single. Abortion at seven weeks, first pregnancy.

It is highly probable that a larger number of these women were infected with the gonococcus than is indicated by the percentage of positive reactions observed. In a study by Kolmer and Brown(16) positive reactions were observed in about 66 per cent. of a small series of cases of suppurative salpingitis. The gonococcus complement-fixation test is not as delicate as the Wassermann reaction and is of more positive than negative value, that is, while a positive result in a properly conducted test is evidence of a focus of gonococcus infection, a negative reaction does not exclude this infection by any means.

*Infections with B. abortus (Bang) and B. abortivo-equinus.* The results of our complement-fixation tests in the present series of cases with polyvalent antigens of these two organisms indicate that these bacilli probably do not play an etiological rôle in the abortion of women.

Weak fixation of complement occurred with both antigens with the sera of two women in this series, but we are not inclined to ascribe significance to them as the sera were slightly anticomplementary. Our antigens were of proven antigenic sensitiveness and it is entirely reasonable to expect that an infection with either of the microorganisms of sufficient extent and severity to produce the profound changes necessary for the expulsion of the fetus and membranes, would have resulted in the production of sufficient antibody

to render detection possible in complement-fixation tests of reasonable delicacy. Certainly this is true of the cow, mare and other animals infected with these bacilli.

The results of our tests do not exclude the possibility of either or both of these microorganisms infecting pregnant women, but simply indicate that in our series there was no immunological evidence of these infections.

The agglutination reactions conducted with sera from twelve aborting women gave uniformly negative results.

In view of the work of others indicating the possibility of *B. abortus* (Bang) being carried in milk it is highly important to exclude the possibility of transmission by thorough bacteriological and immunological examinations of aborting cows before permitting the distribution and consumption of their milk, irrespective of the confidence placed in pasteurization.

#### CONCLUSIONS.

1. Complement fixation reactions with polyvalent antigens of *B. abortus* (Bang) and *B. abortivo-equinus* and the sera of fifty women aborting in the early months of pregnancy, yielded negative results, and indicated that, in these cases at least, these microorganisms were not etiological factors.

2. Since the bacillus of epidemic abortion of cows has been found in milk it is advisable to subject aborting cows to rigid bacteriological and immunological tests for the bacilli before permitting the distribution and consumption of their milk although it has not been definitely proven that the *B. abortus* (Bang) is capable of producing abortion in women.

3. Of these fifty women the sera of only four, or 8 per cent., gave positive Wassermann reactions. Specific treatment of such cases should be continued until the Wassermann reaction becomes persistently negative not only with an alcoholic extract of syphilitic liver as antigen, but more particularly with a cholesterinized antigen.

4. In conducting the Wassermann reactions with the sera of aborting women it is advisable to use cholesterinized extracts as antigens, on account of their superior antigenic sensitiveness and the likelihood of but small amounts of syphilis "reagin" being in the blood.

5. Of these fifty women the sera of six, or 12 per cent., reacted positively in the gonococcus complement-fixation test. It is probable that a larger number were infected with gonococci, as the complement-fixation test is of limited delicacy.

We desire to express our thanks to Drs. B. C. Hirst, J. H. Girvin and W. R. Nicholson for the privilege of obtaining material for the study from their hospital services.

TABLE III.—ANTIGENIC TITRATIONS.  
(With Serum of Cow No. 10 Infected with *B. abortus* (Bang).)

Dose of immune serum, c.c.*	Antigens	
	<i>B. abortus</i> (Bang) (0.15 c.c.)	<i>B. abortivo-equinus</i> . (0.3 c.c.)
.001	†	—
.005	—	—
.02	—	—
.01	†	—
.05	††	—
.1	††	†
.2	†††	†
.2 control	—	—

\* Serum heated at 56° C. for one-half hour.

† Symbols as in Table II.

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## TRAUMATIC SEPARATION OF THE SYMPHYSIS PUBIS.\*

BY

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(With four illustrations.)

**PATHOLOGICAL** separation of the symphysis pubis is not as infrequent a complication of labor as the reported statistics would lead us to believe. The rate of frequency is generally given as one to 25,000 deliveries, although Morgan notes only two cases in 87,000 deliveries at the N. Y. Lying-In Hospital. Keyser states that up to 1903 there were only 130 reported cases in the literature.

These statistics do not really show the actual frequency of the condition, as I believe most of us have seen at least one or more cases. The discrepancy is undoubtedly due to two factors. First—

\* Read at a meeting of the New York Obstetrical Society, October 24, 1916.

many cases go unrecognized and secondly, many are unreported for fear of criticism by the profession.

Etiologically the factors are predisposing and causative. Under predisposition may be noted:

1. The normal increased mobility of the pelvic joints during the latter months of pregnancy. This may occur, even to such a marked degree as to cause joint pains and difficulty of locomotion.
2. Repeated child-bearing is a factor.



FIG. 1.

3. Any disproportion between the size of the fetus and the pelvis such as a large fetus or a small pelvis, especially the funnel pelvis.

4. Disease of the pelvic joints such as previous inflammation, suppuration, caries, osteomalacia, rickets, new growths, etc.

The causative factors are twofold:

1. Spontaneous rupture caused by excessively strong uterine contraction. Some authors doubt the occurrence of such a condition.
2. Traumatic rupture caused by some forcible delivery, either forceps or a version, on the part of the accoucher.

The symptoms may be very marked at the time of the rupture, though many of the recorded cases were not diagnosed until the second to fourth day postpartum. During the performance of a

difficult forceps operation the physician suddenly notes that the delivery becomes very easy and there may be a grinding sensation analogous to the crepitation of a fracture. Some authors describe a pistol-shot sound at the time of rupture. A vaginal examination should make the diagnosis easy.

The patient during the puerperium has very definite symptoms the most constant of which, is pain referred to the back especially on turning in bed or being lifted on the bed-pan. She may also have pubic pain and tenderness and the occurrence of these symp-

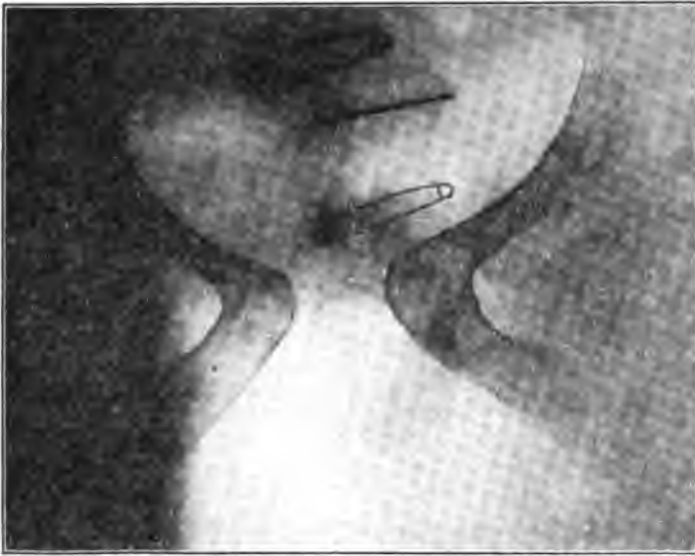


FIG. 2.

toms extending into the second and third weeks of the puerperium, should always make us suspicious of some bony injury.

If the woman is not anesthetized she may actually feel "something give way" as she usually describes it.

The following case coming under the writer's observation seems worthy of elaboration:

**CASE I.**—Mrs. Isabel B., aged forty (No. 18738, Methodist Hospital, Brooklyn), was admitted, at term, to the obstetric ward.

She was Italian by birth, a para-ix, and there was nothing of importance in the previous personal history.

The obstetric history was interesting. The first labor was dry and instrumental and was followed by three normal deliveries. The fifth was dry and instrumental causing a third-degree laceration, which was repaired three months later. The sixth and seventh

labors were normal but the *eighth* was a *forty-eight-hour labor which was terminated by forceps*. This was a very difficult operation, the baby weighing  $10\frac{1}{2}$  pounds, according to the story of the attending physician.

Following this delivery the patient was in bed for sixteen days, suffered extreme sacral pain on motion *and was unable to walk for three months after the delivery*. This labor was two and one-half years before the *ninth or present one*.

After the patient eventually became able to walk, she remained in fair health except for some backache after a hard day's work, or on rotary motion of the thighs.



FIG. 3.

*During the last pregnancy, before coming to the hospital she had no unusual symptoms and considered herself normal.*

Admission examination showed a 40 cm. fundus with a normal L.O.A. position, head at the brim. Vaginal examination showed an unusual state of affairs, in that *the ends of the pubic bones were so widely separated that four fingers could be placed in the interval*. There was apparently nothing between the internal and external fingers except the skin, vaginal wall and a thin band of fibrous tissue. Although the patient was beginning labor, an x-ray plate (see Fig. 1) was taken showing the fetal head above the brim and the wide bony separation, which measured on the plate, proved to be  $7\frac{1}{2}$  cm. Some allowance must be made for the fact that the picture was taken with the patient on the back.

Labor progressed normally terminating at the end of thirteen hours in the spontaneous birth of a  $9\frac{1}{4}$ -pound baby.



Following the delivery the ends of the pubic bone came together to within about 3 cm. of each other.

The pelvis was firmly bound with an abdominal binder and an x-ray, five days postpartum with the patient lying on the abdomen, showed a pubic separation of  $2\frac{3}{4}$  cm. (see Fig. 2).

The puerperium was absolutely uneventful, and although we attempted to restrict her motions in bed, the patient was very active, rolling from side to side and getting up on the bed-pan without any pain whatever.

She was up on the thirteenth day, was soon walking without the least discomfort, and went home on the eighteenth day.

An x-ray on the seventeenth day showed a separation of  $2\frac{1}{2}$  cm. (see Fig. 3).



FIG. 4.

A point of interest about these pubic bone separations, was noted at the time of the discharge examination. With the patient on the back there was a bony separation of nearly two fingers but examination with the patient on the side, brought the bone ends close together. This would seem to show that such patients and also those after pubiotomy should be encouraged to lie on the side as much as possible.

I had an opportunity recently of examining the patient again, eight and one-half months after the labor, and had a final x-ray picture taken. The bone ends are now apparently more widely separated than when she left the hospital, the x-ray showing  $3\frac{1}{2}$  cm. (see Fig. 4). The bone ends move freely, coming close together when the patient is on the side. The fibrous band between the

pubic ends seems thicker than when she was discharged from the hospital. The patient has absolutely no symptoms, considers herself well and cares for a large family of children.

The points of interest in this case are the history of the trauma with the four months of invalidism *followed in two and one-half years by a normal pregnancy and labor, the bone ends separating  $7\frac{1}{2}$  cm. to let the head pass through the pelvis.* Also the absence of subjective symptoms, to-day, in spite of a 3-cm. separation, with still definite mobility of the bones.

61A SEVENTH AVENUE.

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## THE TREATMENT OF CONTRACTED PELVES, WITH SPECIAL REFERENCE TO PUBIOTOMY.<sup>1</sup>

BY

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THE art of obstetrics properly executed not only concerns itself with human life, but also with the reduction of human suffering. Past experience has taught us that the morbidity associated with childbirth is not sufficiently emphasized either by teacher or practitioner.

The reduction of mortality and morbidity of childbirth depends upon our ability to properly manage the pregnant state from the thirty-sixth week of gestation to the end of labor. This is especially true in primiparæ.

The fundamental principle governing obstetrics is refinement of diagnosis, upon it will depend the favorable outcome of patients who suffer from the various forms of dystocia. A timely diagnosis is very often the turning point for both mother and child.

It is unfortunate for the practice of obstetrics that in the majority of cases of complicated labor, a gynecologist is usually called upon to relieve the condition. He, perforce, no matter how competent he may be in his particular field of work, lacks the necessary knowledge and training so essential in dealing with an intricate obstetrical problem. The ideal obstetrician is he who had the opportunity to pursue both gynecology and obstetrics simultaneously. It is to be regretted that these two branches of medicine are divided into sepa-

<sup>1</sup> Read at a meeting of the Medical Society of the County of New York, October 23, 1916.

rate departments in our teaching institutions. I am certain a greater benefit would accrue to either department if the plan adopted in some of the foreign universities would be followed here. In this instance specialization has brought forth many disadvantageous conditions.

To modern social conditions must be attributed an undoubted pernicious influence upon child-birth. By forcing a great number of young women to enter the industrial field early in life, and compelling them to engage in sedentary occupations, their proper physical development is prevented. In the higher social strata the tendency to overtax the nervous system, either by overstudy or by the manifold social duties which they are compelled to perform during the period of life when both mental and physical growth is at its height, usually results in the development of a highly sensitive nervous system incapable of combating with the emergencies of life.

These conditions have created a new problem for the obstetrician; viz., the inability of a large percentage of women to deliver themselves spontaneously.

We now also realize that dystocia due to mechanical obstruction not only depends upon some degree of contraction of the pelvis, but that in a great number of cases the fault is with the fetal head. A pelvis apparently normal in all its dimensions will not permit the passage of an overdeveloped hard fetal head. It is the relation of the fetal head to the pelvis that we must always take into consideration in each and every case. Heretofore too great emphasis has been laid upon pelvic measurements.

This clinical phenomenon must not only be observed at term and when labor has already set in, but careful examination should be made from the time the fetal head is supposed to engage itself in the pelvic basin. Clinical experience has taught us that the fetal head very frequently will be found engaged in the inlet during the thirty-seventh or the thirty-eighth week of gestation, but as it continues to grow will gradually dislodge itself from the pelvis so that when labor is about to commence the head will be found floating above the pelvic brim. Such cases only become abnormal during the last two or three weeks of pregnancy. Had labor been induced at a time when the first signs of disproportion appeared it would in all probabilities have terminated spontaneously. I hold that in the light of our present knowledge induction of labor at a period of full viability of the child is not associated with any danger to either mother or child, and as obstetricians we must endeavor to prevent or spare

our patients the ordeal of going through a stormy and hazardous labor. Hospital statistics of induction of labor are not conclusive and therefore should not be used as a guide. The average hospital patient is not intelligent and therefore it is very often difficult to obtain from them the exact date of their last menstruation. The correct date of this subject can only be gathered from private practice.

The chief objection against this procedure is the danger of misjudging the weight of the child *in utero*. However, I feel that this danger is greatly minimized in the hands of the experienced obstetrician. As a rule the weight of the child can be properly estimated. Labor can always be induced in cases in which the child apparently weighs six or more pounds. There is no danger of prematurity in such infants. They usually thrive and do well. I realize many will question the soundness of this procedure but at this time I am convinced of its practical application. During the past few years I have seen fit to induce labor in patients in whom I noticed signs of disproportion of fetal head and pelvis. There were seventeen such patients. The smallest child delivered weighed 6 pounds 3 ounces, the largest 8 pounds 2 ounces. In one case the head did not engage after a strong test of labor lasting twelve hours and delivery was then accomplished by Cesarean section. The child weighed 7 pounds 4 ounces. I am sure that the morbidity in these cases was greatly reduced and that the lives of not a few infants were saved.

Recent investigations by a number of obstetricians prove conclusively that the period of gestation varies, that the duration of pregnancy in a small number of cases is only 240 days. Not infrequently it is prolonged to 320 or 330 days. It was also shown that only 80 per cent. of women go into labor between 270 and 280 days from the date of their last menstruation. However inconclusive these investigations may be it is nevertheless a clinical fact that a number of women do carry beyond the computed time from one to five weeks. For some unknown reason labor fails to set in and the child's weight increases very rapidly. The bones of the head become harder and are of denser consistency and more closely approximated. The fontanellæ diminishing in size. Moulding of the head during labor can not therefore take place very readily. It has also been found that these infants do not stand labor well and that at least 15 to 20 per cent. die during labor.

All patients who are overdue should be carefully watched and if labor does not set in within a reasonable time it should be induced

in order to obviate a probable dystocia or the birth of a dead baby. There is no reason for allowing pregnancy to continue beyond a certain time particularly when the question of the size of the child is no longer a factor in management of the case. This clinical phenomenon is now recognized by a number of obstetricians. These patients are usually advised to have labor induced as soon as they pass ten days beyond the set date. It is two such unfortunate experiences in my own practice which directed my attention to this class of patients. Since then I tried to prevent this occurrence by advising all patients who are overdue ten days or more to have labor induced.

The great problem in obstetrics is not the management of those cases in which a correct diagnosis has been established early; or those cases which have been mismanaged and are brought to the hospital in a state of exhaustion, the child dying or dead. In either class the indications as to the proper method of procedure is well defined. The class of patients that tax the ingenuity of the most astute obstetrician are those which suffer from a relative disproportion of fetal head and pelvis and in whom labor has already set in. This class is commonly known as the "borderline cases." The obstetrician watching the progress of labor hopes that the pains will be sufficiently strong to cause the head to engage and that it will eventually mold so that labor will reach a stage when delivery by forceps will be comparatively safe for both mother and child. While this hope is usually realized in over 80 per cent. of these patients if they are given a proper test of labor of at least twenty-four to thirty-six hours; in a small per cent. of cases, however, the head fails to engage notwithstanding the strong uterine contractions lasting twenty-four hours or longer. The fetal head is partly jammed against the pelvic inlet, the biparietal diameter is still above the brim. A large caput having already formed either on the anterior or posterior portion of the parietal bone. No one doubts what the procedure would have been, had it been possible to foretell the exact progress of the case. Unfortunately our judgment is fallible and as long as we lack accurate knowledge upon which to base our prognosis in a given case of labor so long will we have cases that will be misjudged. Labor in such cases has now reached a stage in which Cesarean section as a method of delivery must be eliminated. The danger for the mother is too great. The mortality of Cesarean section in this class of patients is more than 20 per cent. We have no right to impose such a risk on the mother for the sake of a child which is not fully viable. The fact that

the fetal heart sounds are still audible does not mean that a child is fully viable. The pressure on the head may be so great that although the child is delivered alive it will not survive longer than twenty-four or forty-eight hours.

*These patients must be delivered by the vaginal route* either by high forceps, pubiotomy or craniotomy depending upon the condition of the child and the parity of the woman.

High forceps, except in rare instances, must be eliminated from the category of modern obstetrics. It is unsurgical in principle. It attempts to pull through a fetal head which is out of proportion to the pelvis. The fetal mortality of this operation in the hands of the most competent obstetricians is over 50 per cent. The invalidism it induces in the mother is too great. The soft parts of the pelvis are so badly mutilated that an attempt at repair is futile. Secondary plastic operations upon the vaginal vault in such cases is almost impossible because of the extensive cicatrizations of the old lacerations. High forceps may only be resorted to in multiparæ who suffer from simple flat pelvis in whom the vaginal vault is relaxed, and in such cases we try to engage the head in one of the oblique diameters and if the biparietal diameter is successfully pulled through the pelvic inlet, the delivery is then very easily accomplished.

The indications for craniotomy are very definite. Its field of usefulness is limited. It is only performed in cases in which the child is dying or dead, or cases in which attempts at forceps delivery have failed after a number of applications. In such cases the viability of the child is impaired. As a general rule the injury to the fetal head is so great that these infants although delivered alive usually succumb during the postpartum period.

Craniotomy ought never to be performed when the child is fully viable. We have no right to kill a child when the physical condition of the mother is good. We must always take into consideration that the danger of infection to the mother may be greatly enhanced by the fact that very often we are unable to extract the child after mere perforation of the head and in addition, are compelled to perform embryotomy in order to complete the delivery. The mother is thus exposed to still greater danger because of the unavoidable injuries to the soft parts as well as the uterine wall.

If what we said about the various methods of delivery, their indications and contraindications is true, how then shall the obstetrician proceed to deliver cases who suffer from dystocia due to disproportion of fetal head and pelvis which were allowed to go into labor with the hope that labor would progress favorably, but unfor-

unately were misjudged by the obstetrician? Or how shall we proceed in that class of cases who are brought to the hospital in emergency after having been in labor thirty-six or forty-eight hours and attended by a midwife or family physician, with a history of being examined frequently after the membranes had ruptured? Infection must be presupposed in such cases and we have no right to endanger the life of the mother in order to deliver a viable child. We are therefore compelled to resort to any method which is least dangerous for the mother and at the same time offers the greatest margin of safety for the child. I believe that in this class of patients pubiotomy becomes the operation of choice. This operation is always performed in the interest of the child and in properly selected cases the infant mortality should be very small. Pubiotomy should never be performed when the diagonal conjugate is less than  $7\frac{1}{2}$  cm.; or when the disproportion of fetal head and pelvis seems to be too great. In such cases the delivery is complicated and the injuries to the soft parts very extensive. The sacroiliac joint is always injured when the separation of the cut ends of the bone is too great. Pubiotomy does not compete with classical Cesarean section, for the abdominal route should not be undertaken in cases in which we must presuppose infection. The mortality rate of the mother is too great. Those cases in which pubiotomy is indicated, Cesarean section is contraindicated and *vice versa*. Cesarean section should be made the operation of election. Pubiotomy is almost always an operation of emergency. It does not even compete with extraperitoneal Cesarean section for the results to the mother are still too uncertain in this method of delivery.

Pubiotomy has also the advantage over any form of Cesarean section in that the patient is not left with a scar in the uterus which may permanently weaken the uterine wall. It is but natural to assume that in this class of cases the uterine wound would not have healed by first intention. Rupture of the Cesarean scar during subsequent pregnancies is becoming a frequent complication and therefore these patients could not be allowed to go through a prolonged labor in the event of a subsequent pregnancy.

Our experience with pubiotomy consists of twenty-eight cases performed at the Jewish Maternity Hospital during the past seven years. This is the second largest series in this country. We always looked upon this operation as a sort of a final helping hand in the management of cases of dystocia. The cases were carefully watched and finally selected because it appeared that a slight increase in the pelvic girdle would permit the passage of a living

child. This operation was never undertaken unless the head was partly engaged or showed a tendency to engage. The cervix was always fully dilated and fetal heart sounds regular and good quality.

Ten of these patients were brought to the hospital after they were in labor twenty-four hours or longer. They were attended by midwife or family physician and were subjected to many examinations after the membranes were ruptured. In five of these cases attempts at delivery by forceps were made but failed. They all showed some sign of exhaustion due to prolonged labor on their admission to the hospital.

Eighteen of this series were hospital cases. They were admitted in labor and not withstanding the disproportion of fetal head and pelvis which these patients had, they were permitted to continue with their labor with the hope that it would progress favorably so that they would either deliver spontaneously or by forceps. However, our judgment in these cases was not correct. They labored twenty-four to forty-eight hours, in one instance sixty hours, the head made an attempt to engage, first transversely, later it slightly rotated into one of oblique diameters, but still the biparietal diameter remained above the brim. On examination the child showed that the heart sounds were good and regular. Here we were confronted with a situation in which the child was fully viable but the mother having been in labor a long time and having had many examinations and was somewhat exhausted, being in our opinion not a proper subject for any abdominal operation. Our only alternative was pubiotomy.

That the field of application of this operation is very small is very plainly demonstrated by the fact that it was only resorted to eighteen times in over 9000 indoor cases, or one in 500 deliveries. Still we feel that when it was employed it saved a number of children who would not have been saved otherwise.

It seems to me that the attitude of many obstetricians toward this operation is untenable. We have no right to dismiss any operation that has been performed over a thousand times by very competent obstetricians all over the world.

Of the twenty-eight mothers, twenty-seven were discharged from the hospital between the fourteenth and the forty-eighth day, their average stay being twenty-one days. One developed gangrene of the toe on the tenth day. She was transferred to a general hospital and finally died. All the children were born alive but not all survived. One died three hours after delivery, three on the second day, two on the third day, one on the sixth day and one on



the twenty-fourth day, eight in all. The cause of death in these children, except one who had a meningocele, was entirely due to injuries to the head from attempts at delivery by forceps or from undue pressure because of a tedious and prolonged labor and really ought not to be ascribed to the operation.

The chief objection to pubiotomy is the complications that may be encountered during its performance. It should never be performed by one who has not had a proper training in obstetric surgery. The danger of injury to the bladder and urethra is very great. We were very fortunate in that respect; in only one case that was operated did sloughing of the bladder wall occur on the ninth day which resulted into a fistula. Communicating tears of the vagina occurred in six cases but they were readily repaired as soon as delivery was completed. Hemorrhage and oozing from the cut ends of the bone were always controlled by pressure and packing. The gait was somewhat impaired temporarily in six patients but it gradually improved and became normal again. Injury to the sacroiliac joint can be avoided if the thighs are properly held by two assistants in order to prevent too much separation of the cut ends of the bone.

The partly open method of Döderlein was followed in twenty-one cases. In seven cases the open method was used. We observed no advantage in his method and it was therefore discontinued.

The following is a short résumé of our series of cases.

**CASE I.**—Para-i. Suffered from endocarditis and myocarditis. Exostosis on second sacral vertebra. Labor was induced three weeks before expected time. Was in labor seven hours. After full dilation forceps were tried but failed. Pubic section was performed, child delivered alive by forceps. Patient remained in hospital thirteen days.

**CASE II.**—Para-i. Admitted to the hospital after being in labor thirty-six hours. Membranes ruptured and the breech presented. Pubic section was performed in order to deliver after-coming head. Child alive, weighed  $8\frac{1}{2}$  pounds. Remained in the hospital nineteen days.

**CASE III.**—Para-v. First labor instrumental, baby dead. Second labor delivered by breech extraction. Two miscarriages in the fifth and sixth month, respectively. Was admitted to the hospital after having had twenty-eight hours of strong labor pains. The elbow presented. Pubic section was performed to deliver the after-coming head. Baby died on second day.

**CASE IV.**—Para-i. Was in labor at home over twenty-four hours. Pelvis deformed. Naegeli type. Cord prolapsed. Child delivered alive weighing 7 pounds 4 ounces.

**CASE V.**—Para-ii. First labor four and a half years ago.

Baby weighed  $5\frac{1}{2}$  pounds. Was in labor twenty-four hours. Forceps was attempted by family physician but failed. Face presented. On admission to the hospital, patient had a temperature of  $101.5^{\circ}$ . On examination, the face was found to be impacted. Delivery was accomplished by forceps after the pubic bone was severed. Baby died three days later from an extensive hematoma of the head and neck. Patient remained in hospital twenty days. This patient delivered spontaneously two years later.

CASE VI.—Para-i. An elderly primipara. Was two weeks overdue. Was in labor thirty-six hours before I saw her. On examination I found the breech impacted in the middle plane of the pelvis. Child apparently large. She was taken to the hospital. Fetal heart sounds very good. It was evident that the head would not pass through the pelvic brim so the gigli saw was introduced as a prophylactic measure. After the body was extracted the head could not possibly be made to engage in the pelvic brim, so the bone was severed, and delivery of the head was then very readily accomplished. Child weighed 9 pounds and was fully viable. Separation of the cut ends of the bone was over 5 cm. Patient developed a thrombophlebitis of the right leg, which gradually improved, and both mother and child were discharged from the hospital on the seventeenth day.

CASE VII.—Para-ii. First labor instrumental, baby dead. Labor induced in the thirty-seventh week because of flat pelvis. Head did not engage notwithstanding strong uterine contractions. Baby was delivered by forceps after the bone was severed. Child died three days later.

CASE VIII.—Para-i. Was advised to have labor induced in the thirty-sixth week of pregnancy because of contracted pelvis, but patient declined to have labor interrupted prematurely. Was admitted to the hospital in labor, head was found floating above the brim. Cesarean section was then suggested but patient refused. After being in labor thirty-six hours the head attempted to engage. Attempt at delivery by forceps failed. The child being fully viable, pubiotomy was then suggested. The bone was severed and delivery accomplished by forceps. Mother and baby were discharged from the hospital on the twenty-third day.

CASE IX.—Para-i. Was in labor twenty-four hours at her home. Three attempts at delivery by forceps was made by the family physician. Patient suffered from chronic nephritis. On admission to the hospital patient showed signs of exhaustion. Pulse  $120^{\circ}$  temperature  $110^{\circ}$ . Forceps was again applied but failed. The child being fully viable so the delivery was accomplished by pubic section. Mother and baby left the hospital on the fifteenth day.

CASE X.—Para-ii. First baby instrumental, stillborn. In labor at the hospital forty-eight hours. High forceps was applied by Dr. Tunick, but head would not engage. After another attempt at forceps' delivery it was apparent that the head was too large and that it would not pass the inlet. Delivery was accomplished by pubic section, followed by forceps. Baby delivered alive weighing

8 pounds. Died twenty-four days later. Mother remained in the hospital forty-six days because of an attack of acute articular rheumatism.

CASE XI.—Para-i. Has been in labor twenty-eight hours. Head did not engage. Version was decided upon. The Gigli saw was introduced as prophylactic measure. Difficulty was encountered in extracting the head, the pubic bone was therefore severed and delivery of the head was easily accomplished. Baby weighed  $7\frac{1}{2}$  pounds. Mother and baby remained in the hospital twenty-seven days.

CASE XII.—Para-ii. First delivery instrumental, baby dead. After being in labor forty-eight hours delivery by forceps was tried, but failed. Pubic section was performed and the delivery completed. Mother and baby remained in the hospital fifteen days.

CASE XIII.—Para-iii. First baby born prematurely and died. Second labor instrumental, child stillborn. Was in labor twenty-four hours at her home, delivery by forceps was then tried, but failed. She was then admitted to the hospital. On examination the fetal head was found jammed in the pelvic brim. Heart sounds regular and good quality. Mother was very anxious for a living baby. Forceps was again tried but it was very evident that the head would not pass through the pelvic brim, so the pubic bone was severed. The patient was allowed to continue her labor and gave birth spontaneously three hours later to a living baby weighing 9 pounds and 3 ounces. Mother and baby remained in the hospital seventeen days.

CASE XIV.—Para-iii. First labor instrumental, baby dead. Second labor breech extraction, baby stillborn. Patient was allowed to go into labor as the baby was apparently small. Breech presented. After the body was delivered the head would not pass through the inlet so the pubic bone was quickly severed and delivery of the head was then very readily accomplished. Mother and baby left the hospital on the twenty-second day.

CASE XV.—Para-i. Was in labor three days at her home. On admission to the hospital the cervix was found fully dilated and membranes ruptured. The head attempting to engage. Failure to deliver her by forceps, pubic section was decided upon. She was delivered of a fully viable child weighing 7 pounds 2 ounces. Mother and child remained in the hospital twenty-six days. Patient became pregnant again and was delivered by a Cesarean section in another hospital.

CASE XVI.—Para-i. Was admitted to the hospital after being in labor thirty-six hours. Forceps were applied nine times at her home, but she could not be delivered. On admission fetal heart sounds were good and was therefore delivered by pubic section. Child weighed 9 pounds 6 ounces. Mother and baby were discharged from the hospital on the thirty-ninth day. Patient became pregnant again eighteen months later and was delivered by Cesarean section.

CASE XVII.—Para-v. Three labors instrumental, children stillborn. One premature birth, baby alive. Was in labor thirty-two

hours, and head did not engage. She was very anxious for a living baby so delivery was accomplished by pubic section. Child born alive, weighing 9 pounds 10 ounces. Forceps was not attempted in this case because it was apparent that the disproportion was too great. Mother and child remained in the hospital thirty-five days.

CASE XVIII.—Para-iii. First labor instrumental, baby stillborn. Second labor instrumental, baby alive. After a strong test of labor the head did not engage and forceps were tried, but failed. The pubic bone was severed. Child delivered alive and died two days later. Mother remained in the hospital twenty-one days.

CASE XIX.—Para-i. Cord prolapsed, version was performed, difficulty in extracting the after-coming head was encountered and the pubic bone was quickly severed. Child was born alive, weighing 8 pounds. Mother and baby remained in the hospital nineteen days.

CASE XX.—Para-iii. One instrumental delivery, baby dead. Second baby delivered by Cesarean section. Breech presented. Patient was prepared for delivery and the Gigli saw introduced as a prophylactic measure. The after-coming head could not be engaged in the pelvis and the pubic bone was therefore severed. A child weighing 7 pounds 9 ounces was delivered. Mother and child remained in the hospital twenty-two days.

CASE XXI.—Para-v. Three previous labors were instrumental. Two children were stillborn. Head did not engage after a long and protracted labor. High forceps were tried, but failed so delivery was accomplished by pubic section. Child weighed 8 pounds and 4 ounces. Mother and child remained in the hospital twenty-six days.

CASE XXII.—Para-i. Was in labor two days in her home, before she was admitted to the hospital. Cesarean section was suggested, but patient refused. Delivery was then accomplished by pubiotomy. Baby born alive but died on the third day from injuries to the head. Mother remained in the hospital twenty-three days. Patient became pregnant again one year later and delivered spontaneously.

CASE XXIII.—Para-iii. One baby living. Was allowed to go into labor with the hope that delivery would be accomplished by forceps. After a few attempts at forcep delivery it was evident that the head could not pass through the pelvis. Delivery was therefore completed by pubiotomy. The baby weighed 6 pounds. Mother and child remained in the hospital seventeen days.

CASE XXIV.—Para-ii. First labor instrumental, child died. After being in labor forty-eight hours, delivery by forceps was tried, but failed. Fetal head sounds still being of good quality pubic section was performed and delivery was completed by forceps. Baby weighed 6 pounds 4 ounces. Mother and baby left the hospital in fifteen days.

CASE XXV.—Para-ii. First labor instrumental. Labor was induced three weeks before expected time. After being in labor twenty-seven hours the head did not pass the brim. Pubic section was performed. Child delivered alive, but died three hours later. Mother remained in the hospital twenty-one days.

CASE XXVI.—Para-ii. First labor instrumental, child stillborn. Was admitted to the hospital in labor. Labor was allowed to continue in the hope that it would progress favorably. After patient was in labor nearly two days the head slightly engaged. Mother was nephritic. She was very anxious for a living child. Baby was delivered by pubic section. Weighed 9 pounds. Patient had to be catheterized during the first three days. Sloughing of the bladder wall occurred which resulted in a vesicovaginal fistula on the ninth day post partum.

CASE XXVII.—Para-vi. One child delivered by Cesarean section, two labors were instrumental. Babies stillborn. Was admitted to the hospital in labor, breech presented. Pubiotomy was performed to deliver the after-coming head. Baby had a congenital meningocele and died three days later.

CASE XXVIII.—Para-v. Previous labors instrumental, babies stillborn. Patient was very anxious for living child. Was admitted to the hospital in labor. She demanded that the child be delivered by Cesarean section. On examining a specimen of urine, it was found full of albumin and casts. Blood pressure, 180. She was therefore allowed to continue her labor and after the cervix was fully dilated, delivery was accomplished by pubiotomy. Mother and child left the hospital on the sixteenth day.

It will be observed that nearly 60 per cent. of the patients were multiparæ whose previous labors were complicated and resulted in the death of the children. The vaginal vault in these cases was lacerated and relaxed. In two cases the cervix could be seen at the vaginal outlet. The relaxed condition of the vaginal vault in a measure simplifies the operation. The carrier is very readily introduced. The parts are not so extensively torn as the cut ends separate and the soft parts of the pelvic floor do not interfere with the delivery of the child which is usually completed by forceps. These patients as a rule have to undergo secondary repair of the pelvic floor and the cystocele which follows this operation in a great number of the cases may be repaired at the same time.

The postoperative treatment is usually very simple. A strip of adhesive plaster 2 inches wide is stretched across the pubic bone from side to side, thus approximating the cut ends of the bone. Care must be taken that no tissue shall be caught between the two ends of the bone. The vagina is packed snugly and the patient is removed to bed. Motion of the lower extremities is allowed, for it does not interfere with the approximated ends of the bone. The bladder must be emptied at least once every eight hours to prevent overdistention. The patient is usually kept in bed twelve days. Walking should be at first assisted by a nurse. The gait may not be very firm and at first, however, it gradually returns to normal in a few days.

Fibrous union takes place in about two-thirds of cases. I do not believe that the pelvis remains permanently enlarged. The fact that many patients give birth to subsequent children spontaneously does not prove that the pelvis was permanently enlarged. In the subsequent labors the children may have weighed less or the fetal head was smaller.

#### CONCLUSIONS.

1. All primiparæ must be carefully watched for disproportion of fetal head and pelvis from the thirty-sixth week of pregnancy. As soon as signs of disproportion appear labor should be induced.

2. Pregnancy should not be allowed to continue much beyond the computed date, for in addition to a possible dystocia nearly 25 per cent. of these infants die during labor.

3. Induction of labor after the thirty-sixth week of pregnancy is comparatively safe for both mother and child.

4. High forceps has no place in modern obstetrics. It should never be used in primiparæ. In multiparæ who suffer from simple flat pelvis it may be occasionally tried.

5. Craniotomy should not be performed on a fully viable child. It should only be done in cases in which the child is dead or dying.

6. In cases which were misjudged or neglected and the child is still fully viable, pubiotomy is the operation of choice, for Cesarean section in such cases must be eliminated because of presupposed infection.

7. Pubiotomy and Cesarean section never compete. One is an operation of the election, the one of emergency. The mortality rate of the mother in pubiotomy is 3 per cent. Should Cesarean section be performed in these cases the mortality rate of the mother would be over 20 per cent.

8. Pubiotomy should never be performed when the disproportion of the fetal head and pelvis is too great. Injury to the sacroiliac joint will occur if the separation of the cut ends of the bone is more than 5 to 6 cm.

9. The Gigli saw may be used as a prophylactic measure in cases of breech extraction in which some difficulty is expected in the delivery of the head, should it be found necessary, the bone can be quickly severed in order to permit the head to pass through.

Finally in order to practise obstetrics properly, it is our duty to utilize every possible means to safeguard the health of our patients. We must in every cast adopt a method of delivery which will be the least dangerous to both mother and child. We must carefully study

the indications and contraindications before we decide upon any particular method. We must come to realize that dystocia due to disproportion of fetal head and pelvis is not always caused by improper development of the pelvis but that in a great many cases it is due to an oversized fetal head. Absence of the fetal head in the pelvic inlet in primiparæ, when labor sets in should put the physician on guard for disproportion or malposition and he should exercise great care in the examination of the patient. Each and every case of labor must be judged in accordance with the clinical findings. A woman may go through labor normally when the child is small, however, a subsequent pregnancy will result in complicated labor if the child is unduly large. We must carefully watch all primiparæ and if any signs of disproportion develop, it is our duty to have labor induced in order to obviate any untoward complications. If on the other hand we are suddenly confronted with a case of labor which did not progress favorably, either due to our lack of judgment or neglect and the child is still viable, our duty to that child is to deliver it alive by a method which is the least dangerous to the mother and this can only be accomplished by pubiotomy.

62 WEST EIGHTY-NINTH STREET.

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## A METHOD OF DETERMINING THE DILATATION OF THE EXTERNAL OS DURING LABOR BY MEANS OF EXTERNAL EXAMINATION.

BY

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IN the very great majority of confinement cases the uterus and its contents are sterile before delivery. A healthy vagina may contain ordinary pathogenic bacteria for a short time after they have migrated from the vulva. The external genitals are usually quite loaded with germ life. Pathogenic bacteria, transferred from without to the vagina, are destroyed in the course of a few days by the acid secretion of the vagina. The bacteria which reach the uterus during or after labor are introduced from without the vagina, through it and into the uterus and adnexa. Modern obstetrics teaches the danger of internal examination which introduces pathogenic bacteria with consequent baneful results. Surgical asepsis has largely over-

come the harmful effect of internal examination during labor, yet even with strict precautions there is still a slight danger of infecting the birth canal.

If we can obviate the necessity of internal examination during labor, puerperal infection will be materially lessened. Rectal examinations are objectionable because they are not always accurate, they increase the danger of infection, and may result in injury to the rectum.

Careful external examination will usually reveal the position of the fetus and its presentation and engagement. Only the amount of dilatation of the cervix has not been noted by external signs. When preliminary examination has been made and the case found to be normal, confinement may be permitted to proceed without examination internally. Because of haste or inquisitiveness the accoucheur desires to know the extent of dilatation of the external os. One or more vaginal examinations are made during the course of labor to the possible danger to the woman. Recently it has been contended that during labor as dilatation occurs, the extent of dilatation is indicated by the rise of the contraction ring above the symphysis. If this can be followed, the obstetrician can know the degree of dilatation by noting the height of the ring by external examination only. So one may follow the course of a labor case carefully without endangering the mother through vaginal examinations.

In considering the uterus during pregnancy and labor we must not think of the ordinary divisions of the nonpregnant uterus. During pregnancy the inside of the uterus is divided into the large upper cavity above the internal os and the almost closed cervical canal below. During labor we have a new division caused by the contraction of the uterine muscle. The upper portion made up mostly of muscle tissue is the active upper segment; the lower uterine segment consisting of cervix and the lower portion of the body is mostly passive. The division line is distinctly marked during contractions by the so-called Bandl's ring. When the uterine muscle contracts during labor, the lower portion of the fetal membranes are loosened and are slowly forced through the cervix as a dilator. The muscular portion of the uterus, which is above the contraction ring, intermittently contracts in its efforts to force out its contents which overdistend it, and thus to regain its original state of closure. The lower uterine segment, which is below the contraction ring, is slightly engaged in active contraction as it contains few muscle fibers, but it is dilated as an elastic band by the projection of the bag of waters through it. As labor advances, and the lower segment



is forced open, the bag of waters and fetus are forced through the passively dilated portion below the contraction ring.

Almost as labor commences the contraction ring is formed a little above the internal os of the cervix which is merely an obstruction, which must be dilated in the course of labor, and serves no other purpose in the act. The ring is a muscular ridge extending transversely around the body of the uterus a little above the internal os. It is at the level of a large coronary vein, at which point the serous coat is firmly adherent to the underlying muscle. It exists only during labor, and can be felt only during labor pains in normal cases. It is not certain whether this band actually contracts or merely indicates the lower circle of contracting muscle which joins the now contracting lower segment. The lower segment becomes distended until it is distinctly thinner than the upper segment.

As labor advances and the lower segment is dilated, the fetal pole is forced into and through this segment, and into the vagina. When this occurs the contraction ring gradually rises from the pelvis until it occupies a space midway between the symphysis pubis and the umbilicus when dilatation is complete. The rise is proportional to the dilatation of the cervix, and tends to indicate the degree of dilatation of the external os. According to Unterberger, when the contraction ring cannot be felt externally above the symphysis, it is certain that the dilatation of the os externum has not reached the size of a dollar (funfmarkstück). When dilatation has reached this degree (above 4 cm. diameter) the ring is to be felt about two fingers breadth above the symphysis. At three fingers breadth above the symphysis the os has attained the size of about 8 cm. diameter (kleinhandtellergrösse). With complete dilatation of the os the ring reaches four fingers breadth above the symphysis, and runs transversely across the uterus. It is to be felt only during contraction, except in cases of threatened rupture when it may also be felt between them.

Unterberger, in Prof. Winters' clinic at Königsberg, tried this method in 300 cases which were also examined internally to determine the correctness of the method. Of these 285, or 95 per cent., were correctly diagnosed. The fifteen failures were due mostly to partially distended bladders obscuring the ring. In only three cases (1 per cent.) did the height of the ring not correspond to the amount of dilatation of the external os as shown by internal examinations. These he called abnormal, one of these required cervix incisions because of rigidity.

At present I am attempting to make use of this method of diag-

nosis, using internal examinations to check up the external. As my cases have been too few to generalize from, I wish to urge others to attempt to do likewise, that a better valuation of the method may be obtained.

A certain amount of patience is required to attain proficiency in palpation. The bladder must be empty. A great amount of abdominal fat or an extremely rigid abdominal wall make the finding of the ring difficult or impossible. The thinner the patient, and the more relaxed the abdominal wall, the easier it is to palpate. Flexing the knees tends to relax the abdomen slightly. In very favorable cases the lower segment feels as a smoothly distended wall at the time when dilatation is about complete, and the ring is prominent at its upper border. To me the ring feels as a furrow above the thinned lower segment, and above the upper segment seems to rise. It can best be felt by placing the finger tips lightly on the lower abdomen just above the symphysis and slowly, lightly moving them along upward until a furrow is felt transversely. It may be necessary to do this several times before the band can be positively identified. It is easier to note in primiparæ where the resistance of the lower uterine segment is great. In multiparæ the band is less distinct the more children have been borne, because the resistance is less. It is more distinct the higher it rises.

It is questionable whether this method is accurate to the extent that is claimed for it. It may be used in a large percentage, however, and when not successful the internal method is available. The degree of success will depend upon the patience and practice of the examiner as well as the amount of fat, edema, abdominal tension and contractile power of the uterus of the patient. Primiparæ have more pronounced contraction rings than old multiparæ in whom there is less resistance along the birth canal. An added advantage of this method of examination is that the obstetrician becomes so accustomed to watching the contraction ring that he can more readily discover an overdistention of the lower uterine segment which forecasts a possible uterine rupture.

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## RECTAL VS. VAGINAL EXAMINATION IN LABOR.

BY

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FOR a most laudable reason, namely, the prevention of sepsis, there is a tendency in some places to supplant vaginal by rectal examination in normal labor. Is this substitution justifiable?

Obstetricians, who employ the vaginal route, in their examination in labor, usually recommend that such exploration be made after the rupture of the membranes, as a prolapsed limb or cord, swept down by the discharging liquor amnii, will then be discovered. Besides this, a better study of the presenting part may be obtained at this time. Certainly an examination made by the vagina in the very early stages of labor would elicit very little information. To my mind, with the head engaged, a very good time to make this primary and usually only exploration, is *just before* the membranes rupture, when the cervix is nearly fully dilated. By rupturing the bag of waters, in case a more minute examination of the presenting part is desired, or permitting the membranes to rupture spontaneously after withdrawing the fingers, a very efficient autogenetic douche is obtained, which thoroughly washes out the vagina subsequently to the examination. By abdominal palpation and rectal examination, engagement of the head and the degree of cervical dilatation is noted, and when the "corking of the brim" and lower uterine segment occurs, there is practically no danger of prolapse of the cord or a limb taking place. So by abdominal palpation and rectal exploration we can gage the time for making the vaginal investigation. Rarely is a second vaginal examination required in normal labor.

In fact is any vaginal examination necessary in normal parturition?

I merely want to refer to the useful and meritorious subject of abdominal palpation in pregnancy and labor, as an adjunct to vaginal and rectal examination during partus. Much useful information can be obtained from abdominal palpation. It should always be used as a method of equal importance to either vaginal or rectal procedures. Leopold, Spörlin and MacLennon speak of contracted pelvis which could be easily inferred from one abdominal examination, when even twenty vaginal examinations failed to disclose the

true condition to their pupils. (Leopold and Spörlin, *Archiv für Gynäkologie*, Bd. xlv, S. 337). Schröder remarks that the neophyte is less likely to make mistakes by using abdominal palpation than the internal method. (Geburtshülfe, Olshausen and Veit, 1888 p. 135.)

Kerr remarks that many have given up altogether using the vaginal examination in labor, but thinks this position too extreme.

MacLennon rightly states "that these two methods, abdominal and vaginal examinations are not rivals, but complementary, confirming and supplying information by one method not discovered by the other."

Frommel thinks that with experience in abdominal palpation the vaginal investigations can be reduced in frequency or even dispensed with entirely. (*Deutsche medicinische Wochenschrift*, 1892, No. 10, S. 202.)

Contrary to the idea of some practitioners, there is much more to be observed in a vaginal examination than merely the degree of cervical dilatation and rupture of the membranes.

The following is an outline of things that should be investigated during a vaginal examination in labor. The chief divisions are arranged anatomically from below upward. Any of these conditions could influence parturition.

#### VAGINAL EXAMINATION IN LABOR.

*Italics.* Conditions felt in rectal examinations.

*Parenthesis.* Conditions recognized during abdominal palpation.

*Brackets.* Conditions noted in the vaginal examinations in pregnancy.

#### INTROITUS.

[Cystocele, rectocele, hernia, prolapse, perineal rigidity, relaxation or laceration, condition of the hymen, cyst or suppuration of Bartholin's glands, varicose veins or hematoma of the vulva.]

All these conditions are ascertainable in the vaginal examination in pregnancy.

#### VAGINA.

[Amount and character of the vaginal secretions, relaxation or rigidity of the pelvic floor, congenital malformations, primary or secondary stenosis, bands, tumors, fistula, ulcers, *sharpness and size of the ischiatic spines*. *Palpate sacrum* and pubes, especially for bony tumors. The writer saw a case showing callus following a previous pubiotomy, which complicated labor.]

All these conditions are discoverable in the vaginal examination in pregnancy.

## VAGINAL VAULT.

[*Pelvic tumor or inflammation, a large vesical calculus, hematoma of parturient tract occurring during pregnancy.*]

All these conditions noted in vaginal examination in *pregnancy*.

## CERVIX AND OS.

[*Stenosis and postconceptional atresia.*]

[*Hypertrophy, consistency and edema of cervix.*]

*Dilatation of os and degree of effacement of cervix. Presentation or prolapse of cord or fetal limb* [placenta previa.]

All recognized during vaginal examination in *pregnancy* or by the rectal route in parturition, *except* perhaps placenta previa, which might be suspected by the high position of the lower pole of the fetus in the course of abdominal palpation, a dome-like vaginal vault and "cushion" feel to the vaginal finger. Symptoms would probably materially help when employing any method.

## MEMBRANES.

*Intact or ruptured—Protrusion during pain of bag of waters—Adherent membranes.*

All satisfactorily diagnosed per rectal route *except* adherent membranes.

## PRESENTING PART.

(*Nature of the lower pole*) whether vertex, breech, face, etc. *Direction of the sagittal suture. Feel fontanelles, note asynclitism* if present, and amount of (*flexion of head*). Also the (*degree of engagement*) whether "floating," freely movable above the brim; "fixed in the inlet," when moderate pressure will not dislodge it, but its parietal bosses have not passed the inlet; "engaged," when greatest transverse plane has passed the inlet and lowest part of the head having reached the interspinous line; head in the "midplane," when lowest part of the vault lies between the tuberosities; "at the pelvic outlet," where the two parietal bosses are passing the tuberosities; and "on the perineum" when it lies in the distended vagina and perineum. This classification is according to DeLee. In defective ossification of the bones of the skull or when a *caput succedaneum* obscures the sutures and fontanelles, the ear of the fetus should be examined.

Concerning the sutures and fontanelles the following points will probably help in making a diagnosis of position.

The anterior fontanelle is characterized by being quadrilateral

or lozenge shape, and has four sutures running into each angle; its large obtuse angle points posteriorly and it is the larger of the two fontanelles. The posterior or small fontanelle is triangular or Y-shaped, and has but three sutures running into it. The angle of the Y points anteriorly. The writer has noticed two further points differentiating these two fontanelles. When "railroading" the sagittal suture, with the gloved finger-nail, if going *posteriorly*, the finger is "switched" off at an *obtuse* angle either, figuratively speaking, to the "Northeast" or Northwest, "whereas when traveling *anteriorly* the finger is "switched" off at a *right* angle either to the "East" or to the "West." This is due, of course, to the different angles of junction of the coronal and lambdoid sutures with the sagittal. Also one will find that the partial bosses are usually nearer to the anterior than the posterior fontanelle. The lateral fontanelle is near the ear and the zygomatic process with the edge of the orbit. Be sure there is no false fontanelle in the line of the sagittal suture (DeLee).

The lambdoid and coronal sutures have only one fontanelle in each on the vertex of the skull, while the sagittal suture has its terminals ending in the anterior and posterior fontanelles. The sagittal suture is less arched than these other two sutures, and the latter two lie in strongly curved planes.

The tragus of the ear points to the face and the helix to the occiput. With the *exception* of the palpation of the ear and a more favorable examination of the sutures and fontanelles, the above points, in reference to the exploration of the presenting part, are discoverable *sufficiently well* by rectal examination and per abdominal palpation.

#### UTERUS.

[(Malformation) (tumors) and (malpositions).] All recognized by abdominal palpation or a vaginal examination during *pregnancy*.

#### ABNORMALITIES.

[Of (position) and (presentation) or any pathological condition.] All noted by abdominal palpation and vaginal examination in *pregnancy*.

#### MEASUREMENTS.

[Size of cavity estimated. The diagonal internal conjugate and Müller's or Kerr's methods for estimating the relative size of the head and pelvis should be undertaken. The comparative size of the outlet should be estimated.]

All ascertained by the vaginal examination in *pregnancy*.

## CONFIRMATION.

The confirmation of the abdominal palpation examination can be done sufficiently well by the rectal route.

## EDUCATIONAL.

The rectal is just as important as the vaginal method. The writer has gone into detail because of the subject discussed, the comparative value of the rectal and vaginal routes in labor.

Müllerheim suggests observing every factor which may be useful in diagnosis, treatment and prognosis. This is decidedly the most scientific view. (*Die äussere Untersuchung der Gebärenden*, Berlin, 1895.)

In the above list with the exception of a palpation of the ear, recognition of adherent membranes, and a more minute examination of the presenting part, the combination of methods, a vaginal examination in pregnancy, abdominal palpation in pregnancy and labor, and a rectal examination in labor will suffice.

Warden (*Glasgow Medical Journal*) prefers the vaginal to the abdominal method; he gives the following list of conditions, the presence of which cannot be ascertained by abdominal palpation:

1. Prolapse of cord.
2. A band complicating head presentation.
3. Edema or prolapse of the anterior lip of the cervix.
4. A small pedunculated prolapsed ovarian cyst.
5. A uterine or other tumor in Douglas' pouch.
6. Exostosis of the sacrum.
7. Narrowing of the outlet as in slight osteomalacia.
8. Marginal placenta previa, where the bulk of the placenta is situated posteriorly.

In reference to the risks attending examination and instrumentation of the vagina, Eden, of Queen Charlotte Hospital, London, remarks, that under favorable conditions and by a competent obstetrician, the "forceps operation is devoid of any serious risk to the mother; the higher morbidity rate in forceps cases than in natural births may be due to the prolonged and difficult labor in such cases rather than to the actual forceps operation." (Eden, *Practical Obstetrics*, 1915.)

In the Rotunda Hospital, Dublin, where vaginal examinations are made routinely, out of 38,328 cases the mortality due to all causes to which the process of parturition renders the mother liable, but whose occurrence might have been avoided, the principal

example of such cases being septic infection, was 0.101 per cent. The returns of the Registrars-General of England and Ireland for the same cause of death under similar circumstances was 0.19 per cent. (septic cases) out of 10,356,235 labors. Jellett goes on to say that "if due precautions are taken, septic infection in the case of previously healthy women should not occur, and hence there should be no mortality from it." Purefoy, master of the Rotunda Hospital from 1896 to 1903 had no maternal deaths in 431 forceps cases out of 11,098 deliveries.

Ashfeld (*Deutsche medicinische Wochenschrift*, 1896, No. 44) takes the position that practice is required in internal examination and also that if strict asepsis and antisepsis be employed, a few vaginal examinations do no harm, and the results in his clinic are not impaired thereby. Hofmeier likewise, for educational reasons, and because an external examination is inconclusive, continues using the vaginal examination. He claims that if antisepsis is thorough that the latter method is preferably safe. (*Deutsche medicinische Wochenschrift*, 1896, No. 44.)

I have no comparative statistics concerning morbidity records in clinics using the rectal or vaginal examinations in labor, but who would have the temerity to deny that there are less consequences in the former, as a vaginal examination during parturition is always charged with evil possibilities, and in spite of the above favorable reports and statements, the mortality rate following parturition can probably be still further reduced. To accomplish this result we should do everything and adopt every method which does not endanger a mother's life or health. And furthermore many physicians who attend a large percentage of labor cases, make their number of vaginal examinations in inverse proportion to their knowledge of asepsis and antisepsis. During the vaginal examination or operative procedure, the vaginal flow is reversed and material, helplessly stagnated at the introitus, may be carried into the cervix with unhappy results.

We recognize the fact that the cervix is more readily found per vaginam, also that the sutures and fontanelles are more easily differentiated. The nature of the presentation, asynclitism, prolapse of cord or limb, rupture of the membranes, where there are no forewaters, may not be so well recognized by the rectal as the vaginal route. Concerning the membranes there, of course, cannot be any appreciation in the rectum of fetal hair, wrinkling of the scalp, or recognition of the liquor amnii flow when pushing up the head, points denoting rupture of the membranes. But the discharge of



liquor amnii, vernix caseosa or meconium from the vagina would help us in coming to a correct conclusion in this respect. As stated above placenta previa and adherent membranes may be missed per rectal exploration. A hypertrophied lip of the cervix may be confused with a prolapsed limb. Munroe Kerr reports a number of errors made during the employment of the vaginal route. These of course would likely occur during a rectal examination. A macerated head and in a breech presentation, a very edematous scrotum, and still more rarely a cystocele may also be mistaken for the unruptured bag of membranes. A slight degree of malpresentation and malposition may be overlooked. Barnes once mistook a hematoma of the cervix for an inverted uterus. In atresia of the external os, following slight inflammation during pregnancy, resulting in agglutination of the mucous membranes, a mere dimple would represent the os, which would be difficult to find either by rectal or vaginal examination. The writer delivered a patient upon whom a cervical incision was required, because of an atresia following a trachelorrhaphy performed by a general surgeon during pregnancy. The child was a full-term cyclocephalus.

A thinned-out cervix over the presenting part, the landmarks of the head being distinctly felt through the attenuated cervix, a full dilatation of the os might be wrongly diagnosed, and forceps applied with disastrous results, as has been reported a number of times. This mistake has been made after vaginal exploration, but probably was inexcusable as the examining finger would become arrested in the fornices. A thinned-out cervix over the head might follow undue stretching of the anterior or posterior wall, following a backward or forward displacement of the os. Vaginal hematoma may be confused with inversion of the uterus or a submucous myoma protruding from the os. The latter has been mistaken for a prolapsed cord by no less an authority than Munroe Kerr. A mucous polyp of the cervix may cause a similar error. Early carcinoma of the cervix may escape notice by either route, as might a small impacted ovarian tumor; also a flattened-out fibroid on the anterior surface of the uterus.

A pedunculated uterine fibroid has been missed altogether, and a myoma has been mistaken for an ectopic sac or a second fetus during labor. The opposite error of neglecting the delivery of a second twin, mistaking it for a fibroid, would be unforgivable. Seitz reports a diagnosis made of congenital hypertrophy of the cervix when the true condition was edema of the cervix produced by great accumulation of the feces in the rectum. (*Centralbl. f.*

*Gyn.*, March 11, 1905.) A caput succedaneum may be mistaken for unruptured membranes or an encephalocele; the latter returning in the skull when pushed upon, while the membranes protrude with a pain.

These errors occurring during either vaginal or rectal examination should put us eternally on our guard. I have therefore collected a certain number of possible mistakes, and the fact of the chance of their occurrence will suggest the formulation of a rule which may guide some of us who frequently employ the rectal route *primarily* in normal labor.

Rectal examination *per se* has some advantages over the vaginal route as the following will show.

1. Practically painless.
2. No danger of sepsis.
3. Easy to perform, as it does not require any preparation of patient or physician.
4. Can make any reasonable number of examinations with no danger of puerperal sepsis following due to the examination.
5. By more permissible examinations, progress of labor can be satisfactorily followed.
6. Rectal condition, as tumor noted.
7. Confirm emptying of rectum in labor, as scybalous masses may be present.
8. Can take plenty of time for the examination.
9. Certain uterine abnormalities recognized better per rectal route when seen late in pregnancy or labor, as the existence of a second nonpregnant horn of a uterus bicornis, which is usually situated posteriorly.
10. Peace of mind of the accoucheur during a fever in the puerperium, as also, freedom of blame to the physician himself as far as a vaginal examination is concerned.
11. Fetal parts felt only by rectal route in certain uterine tumors, as fibroid on anterior surface of the womb, or in backward displacement of the uterus.

Because of the possibility of introducing the thumb between the labia in a patient already prepared for delivery, it is best to use a sterile glove during a rectal examination. Short-fingered accoucheurs should certainly use the sterile glove. An ordinary clean glove might be employed by others. Mucilage of tragacanth should be used as a lubricant instead of vaseline, as the former is easily washed off the glove.

The areas near the so-called rectal valves should not be confused with the cervix.

Rectal examination alone is no competitor and cannot replace the vaginal route. Moreover the rectal exploration together with an abdominal examination in pregnancy and labor is too conservative. But notwithstanding that the latitude of possible error is greater in a small percentage of cases by the rectal route, we think that the trinity of methods, a vaginal examination in pregnancy, abdominal palpation in pregnancy and labor with the employment of the rectal route in parturition, for all practical purposes, is a worthy substitute for the vaginal examination in labor.

The above combination of methods however should be subject to the following rule. *When in doubt concerning the diagnosis of important conditions by the rectal route, resort immediately to the vaginal method.* It might be said that as over 90 per cent. of labors are normal, so why ever use the vaginal route, except when an operative procedure is indicated. Is it scientific to hobnob with chance and bed-fellow with luck? This is the age of preventive medicine, and many serious obstetric conditions can be avoided by the early knowledge on the part of the operator of the true situation before craniotomy is indicated. We should at all times keep in touch with the work and by so doing avoid error as much as possible.

It appears to be a remarkable fact how little the rectal route is used either in maternities or in private practice. De Lee suggests its use to avoid frequent vaginal exploration during parturition, while Kerr remarks "that a rectal examination is rarely if ever called for in obstetric practice." Rectal examination, like the vaginal route, merely requires experience in order to recognize conditions. It is not a difficult method of diagnosis. Nor should the rectal route develop a timidity about making a necessary vaginal examination. It will probably make the obstetrician careful concerning unnecessary use of the latter method.

The writer has found the rectal route useful in the following conditions:

1. In conjunction with abdominal palpation in pregnancy and labor, and a vaginal examination in *pregnancy* for diagnostic purposes in parturition.
2. As an adjunct where the vaginal route is employed in labor, to avoid numerous investigations by the latter method, to note progress of labor, and possibly to discover the cause of delayed labor.
3. To get information concerning a gauze sponge left in the vagina

after a perineorrhaphy. The bulging of the sponge is felt in the rectum.

4. To see in the puerperium if the uterus is retrodisplaced; to guide us in permitting early getting out of bed.

5. Routine rectal examination in *pregnancy*, may discover a rectal carcinoma, pedunculated fibroid of the rectum, uterine tumors and abnormalities, etc., Cesarean section is indicated in rectal carcinoma, as it is harmful to drag a child forcibly past such a tumor.

6. Observe advancement of the head, during a pain, to note progress of labor.

7. To note whether the placenta, after detachment, lies in the lower uterine segment or vagina.

8. In delayed labor to note if spines of ischium are prominent.

9. After a forceps operation, in suspected cases, to see if spines of ischium or coccyx are fractured.

10. In "twilight sleep" the rectal route, usually causing little disturbance of the patient, can be employed to note progress of labor.

11. Using rectal examination combined with abdominal palpation in labor, the time for making the primary vaginal examination can be estimated.

12. Sometimes manual flexion of the head in delayed labor can be slightly corrected, thus helping anterior rotation.

13. Nurses understanding rectal examinations, can more efficiently watch the progress of labor.

Our conclusions are as follows:

1. Rectal examination alone, nor when combined merely with abdominal palpation in pregnancy and labor, as a substitute for vaginal examination in parturition is not compatible with an intelligent management of childbirth.

2. But the rectal route with abdominal palpation in pregnancy and parturition, and the vaginal examination in *pregnancy*, subject to the rule, "when in doubt . . . resort to the vaginal route," can be used in the *majority* of labors *without necessitating any vaginal examination during labor*. Keep out of the vagina in labor except when necessary to do otherwise.

3. Do a primary vaginal examination in all cases first seen in labor and in all cases of delayed labor, and of course where operative interferences has been indicated.

4. Use the rectal route as an adjunct to a primary vaginal examination, thus avoiding *numerous* vaginal examinations, which should always be condemned.

5. Do the vaginal examination *before* rupture of the membranes, the cervix being dilated, as diagnosed per rectum, and get the benefit of the autogenetic douche of liquor amnii.

6. Rectal examination and abdominal palpation in pregnancy and labor should be more thoroughly taught in medical schools.

#### REFERENCES.

The obstetrical works of Kerr, De Lee, MacLennan, Jellett, and Eden.

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### COMPLETE RUPTURE OF THE UTERUS AT FULL TERM WITHOUT HEMORRHAGE OR SHOCK; RECOVERY OF BOTH MOTHER AND CHILD.\*

By

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ONE of the most alarming accidents that confronts the obstetrician at the time of labor is rupture of the uterus, equally dangerous to mother and child and demanding prompt and accurate action by the obstetrician. This condition is one that is hard to realize or appreciate until it has been the misfortune of the obstetrician to have a case. Fortunately it is comparatively rare, but according to DeLee, Hirst, Webster, Williams, and many other noted authors the condition is not nearly so rare as the older writers would have us suppose, and undoubtedly many cases have terminated fatally undiagnosed.

With the parturient woman under observation this condition should seldom occur, and this is one of the most important reasons for the more rigid care of the mothers during the last six or eight weeks of pregnancy. Dr. John F. Moran has spoken of the necessity for the care of mothers before labor, and I agree with him that with the supervision of the mothers in well regulated institutions, proper exercise, plenty of food and rest, our infant mortality for the first few weeks of life, can be greatly reduced and labor be made much easier.

Much money is being spent to provide hospitals for the care of the mother and child during labor and afterward, but there are very few institutions where our charity cases can go for the last few weeks of pregnancy and have the proper care and the necessary examinations that are so necessary to healthy offspring. If we

\* Read before the Washington Obstetrical Society, Feb. 11, 1916.

want to breed fine colts, calves, pigs, or any other animals, the greatest care is taken of the animal before and during the birth of its offspring, and yet we are doing very little for the poor mothers who are unable to do for themselves. The case I will report illustrates these facts.

Moscow Maternity gives 124 ruptures in 118,581 cases. Fifty-eight of these were complete, forty-three incomplete, twenty-three not determined. The New York Lying-In Hospital had seventy-five ruptures in 60,000 cases, forty-six being complete, thirty-nine incomplete. This gives one rupture for the Moscow Clinic in 956 confinements, New York Lying-In Hospital, one rupture in 800 confinements.

Bandl states rupture is more common in multipara by eight to one. According to Davis' classification, the causes of rupture are uterine, fetal, pelvic, vaginal, and intrauterine manipulations. Spontaneous is much less common than the traumatic rupture.

Trask states that during pregnancy rupture in the body or fundus occurs in 68 per cent.; in the cervix in 32 per cent. During labor 55.5 per cent. involve the cervix, 8.5 per cent. the fundus, 36 per cent. the body of the uterus. According to Davis' statistics, rupture involves the lower segment and cervix in 53.8 per cent., the rupture usually being more to the left than to the right side.

At the Moscow Maternity, including the entire series of complete and incomplete, the mortality reached 87 per cent. In Lobenstine's series the mortality was 83 per cent. in forty-six complete ruptures, and 52 per cent. in twenty-nine incomplete ruptures. Of twelve different clinics, the mortality ranged from 21 to 65 per cent. DeLee lost eight out of ten cases from hemorrhage or shock.

Symptoms and signs vary according to the site and the extent of the rupture.

The prognosis depends on whether the rupture is complete or incomplete, on the location, and on whether treated in hospital or in home, whether in the hands of competent surgeons or midwives, and the nature of the treatment. The prognosis is less favorable with complete lateral tears because of the liability to serious hemorrhage from the uterine arteries.

Diagnosis is as a rule easy at time of labor in complete cases. although there may be no symptoms or signs, and the diagnosis be only made at operation.

The treatment consists in packing, which is usually used for rupture of the cervix, suturing of the rupture, or abdominal section with removal of the uterus.

CASE I.—M. B., colored, aged eighteen, occupation laundress, single. Admitted to Columbia Hospital June 25, 1915, 3:45 P. M. On admission her temperature was 102, pulse 120. She stated she had been in labor for three days, but walked from the third floor of her house to the ambulance. Menstrual history began at thirteen, regular four days, scanty, painful; last month unknown. Family history: Mother died of tuberculosis; father living, in good health; past history negative.

Examination by interne: measurements, spines, 20 cm.; crests, 22 cm.; external conjugate, 17 cm.; uterus extended to the 7th rib on the left side; fetal heart strong in the left lower quadrant. Vaginal examination: Membranes not ruptured; cervix fully dilated; vagina very shallow.

The patient was prepared for delivery, necessitating three enemas to get any return.

The patient was again examined by the interne at 11:30 P. M., and the membranes artificially ruptured with the escape of only about one ounce of fresh looking blood, and with very little or no amniotic fluid. The nurse was instructed to take temperature and pulse every hour and to watch for rupture of the uterus. Her temperature at 8 A. M., June 26, was 98.6, pulse 88.

On June 26, I was called to see the patient between 9 and 10 A. M. Measurements were the same, but no vaginal examination was made by me. The patient was sitting up in the delivery room on the bed. Pulse was good. The temperature normal. Examination showed the fetal heart good in the left lower quadrant. The patient was complaining of continuous pain and the uterus was contracted and extended high up in the epigastric region. As I had an urgent call, Dr. Riggles was asked to see the patient and make a vaginal examination and I would return in an hour. On my return Dr. Riggles reported that there was a large tumor filling up the pelvis and pushed well down into the vagina, which was thought to be a fibroid or a gumma, so that it was difficult to get two fingers into the vagina. The cervix was retracted. The patient was prepared for immediate operation, and on account of the tumor which we thought was possibly a pedunculated fibroid, it was thought best to make a low incision so that we could handle the tumor. A median low incision was made and the abdomen opened at the umbilicus. In making the incision the bladder, which had been drawn up a little above the umbilicus, was opened for about  $1\frac{1}{2}$  inches on its anterior wall before I realized that the bladder was entered. The bladder was immediately closed with two rows of catgut, and the incision was then extended high up, nearly to the ensiform, and the abdomen opened to within about  $\frac{3}{4}$  of an inch of the umbilicus. On opening the abdomen there was free yellow fluid but no blood. The fundus of the uterus extended well up under the margin of the ribs. The hand was passed behind the uterus and the umbilical cord was lifted up into the incision. The fundus of the uterus was then delivered and the child came out through the rent in the posterior lower segment, which was about  $3\frac{1}{2}$  inches in length and occurring at Bandl's con-

traction ring, extending a little more on the right than on the left side of the median line. The cord was cut and the baby was handed over to an assistant. The placenta was removed quickly. The left hand was passed through the rent into the inside of the uterus, lifting the uterus well up into the wound, also controlling the oozing. The abdominal cavity was sponged out with gauze, the intestines quickly packed out of the pelvis, and the body of the uterus amputated after dissecting off the bladder. The cervix was closed with chromic catgut as in an ordinary hysterectomy.

On examining the pelvis no tumor could be seen which was attached to the uterus at all, but there was a hard tumor mass that could be felt behind the rectum and peritoneum, filling the pelvic cavity about two-thirds full. The abdominal wound was closed with cat-gut, silkworm gut, and fine silk. A small rubber tube drain was left in the vesical space down to the bladder. Time of operation, one hour and sixteen minutes. Pulse 100 at beginning, 132 after operation. Blood pressure before operation 152, during operation 136 to 146, after operation 134. During the operation 600 c.c. of salt solution was given hypodermically. The child at birth weighed 5 pounds, 14 ounces.

The after treatment consisted of salt and coffee by rectum, morphine when necessary, plenty of water by mouth; the bladder was catheterized every three hours and irrigated with normal salt solution twice a day, and once a day 1 ounce of a 2 per cent. solution of protargol was left in.

The mother made a very good recovery, but continued to run a temperature from 99 to 101.

July 12. The patient has been getting along well, regaining control of her bladder on about the eighth day. She was examined by Dr. Boveè, who advised removing a section of the growth for diagnostic purposes. Under ether anesthesia a transverse incision was made in the posterior wall of the rectum behind the sphincter, the posterior rectal wall was dissected up, and a finger was introduced behind the rectum. A hard mass occupying about two-thirds of the pelvic cavity could be felt. There was no fluctuation. A piece of this tumor was excised, and the wound in the rectum closed by continuous catgut. The patient had no trouble whatever after this operation; nor did it interfere with the bowel function.

Major Whitmore reported that the tumor was a myofibroma that was undergoing myxomatous degeneration. In one place there are numerous decidual cells in the lymph spaces in the tumor, and in these spaces there are collections of mononuclear round cells and a few small collections of polymorphonuclear round cells. No evidence of malignancy.

October 22. Supplemental report. The large cells which were considered to be decidual cells are ganglion cells. Many of them have processes running out for some distance from the cell. This is only of scientific interest and does not affect the opinion that the tumor is not malignant. Borst cites a similar case of v. Rindfleisch's.



## INTERSTITIAL PREGNANCY, REPORT OF A CASE.

BY

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(With one illustration.)

THIS form of ectopic pregnancy is rare enough to merit a report of every case seen in practice. The proportion of cornual or interstitial pregnancies to the more frequent tubal variety is variously stated from 2 per cent. upward. Ward \* quotes Rosenthal as claiming 30 per cent. of 1324 ectopics to be of this variety.

It is interesting to note the fact that many famous obstetricians and gynecologists have not seen a single instance or perhaps only one instance of this condition. Lawson Tait, who, following Mariceau and Parry, made ectopic pregnancy famous, saw one case. Martin saw only one case. Bandl saw a specimen in a medical museum in Vienna. Doran found six specimens in hospital museums in London. Werth who contributed a valuable paper in Winckel's *Handbuch der Geburtshilfe und Gynäkologie* (vol. ii, pt. 2, 1903) had not seen a single case. Weinbrenner (*Zeitsch. f. Geb. u. Gyn.*, vol. li, p. 57) collected thirty-five authentic cases up to 1904, while he, like several others, finds many reports which do not bear careful scrutiny.

A glance at the literature seems to show that G. G. Ward's case is the latest case reported and therefore I shall briefly report my own case as immediately succeeding his, at least chronologically so.

Mrs. W., aged thirty-five, para-iv, was five and one-half months pregnant when symptoms of intraabdominal hemorrhage necessitated her transfer from a suburban town to Georgetown University Hospital on May 9, 1916. I was informed by her physician that she had not always had good health; that she had once had an abdominal section (for what purpose I do not know) and was of exceedingly nervous temperament. He also informed me that she had been very much annoyed by pain in the right side of her abdomen as the pregnancy had progressed, and that she had consulted competent surgical and obstetrical experts, who all agreed that the pregnancy was in the right broad ligament, or that the uterus contained a fibroid in or near the right cornu.

\* AM. JOUR. OBST., N. Y., 1913, vol. lxvii, p. 1007.

The patient showed all of the symptoms of hemorrhage, such as weak and rapid pulse, and general collapse which persisted for several hours after her admission to the hospital. A slight metrostaxis was present but the pain was not indicative of uterine contractions.

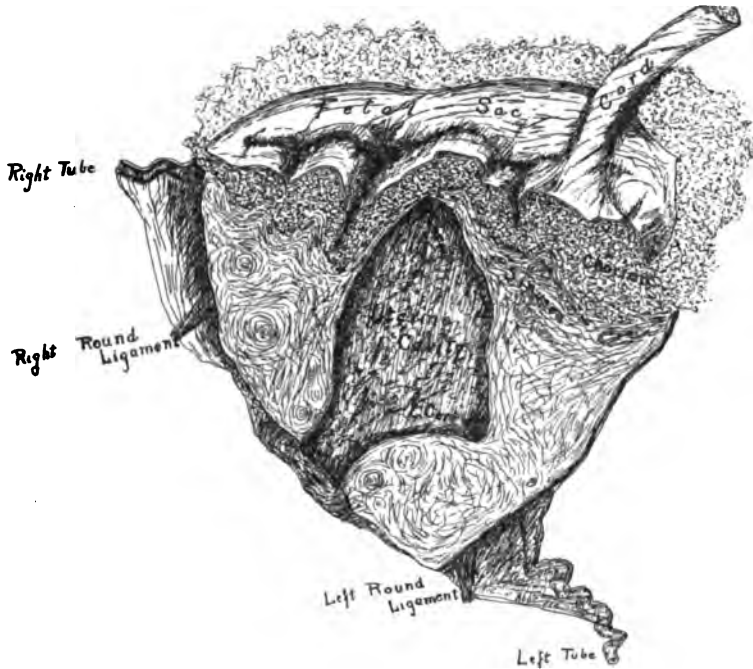


FIG. 1.—Interstitial pregnancy.  $\frac{1}{4}$  natural size. Section of specimen removed by Dr. I. S. Stone showing coronal section of uterine body just in front of cornua, opening fetal sac and uterine cavity.

NOTE.—1. The implantation of the spongy chorion in the right tubal canal almost at the uterine mucosa, there being practically no uterine muscle between the chorion and the uterine mucosa. 2. The irregular shape of the uterine cavity due to the enlargement of the right half of the uterus. 3. The increased distance between the round ligament and the tube on the right side as compared with the left side. 4. The increased thickness of the uterine wall on the right side at the level of the tubes. 5. The large sinuses in the chorion near the cord, and the more numerous ones in the uterine wall under the implantation of the chorion. 6. The roughened surface of the uterine cavity from which the decidua evidently has been recently discharged. 7. The diameter of the umbilical cord. The fetus measured 21 cm. from vertex to coccyx, 30 cm. from vertex to feet. The head measured 6.5 cm. biparietally; 8.2 cm. occipitofrontally.

The os uteri was rather soft but there was no reason to suspect intrauterine pregnancy. The abdomen was distended by a tumor which appeared to be quite movable but strongly inclined to the right side. It was oval in form and unlike a pregnant uterus, although we could definitely outline portions of the fetal body.

The condition of the patient soon began to improve after her arrival at the hospital, and we waited thirty-six hours before operating. By this time, however, she was in good condition and everything appeared to indicate a favorable result. When the abdomen was opened we found a free hemorrhage proceeding from a rupture in the upper portion of the tumor. A large quantity of recent blood poured out of the incision as we turned out the tumor (uterus and contents). A rapid supravaginal hysterectomy was done and the specimen and contents turned over to assistants. A large amount of firm dark blood clot was found on the right side of and above the tumor, which showed the extent of the first hemorrhage and confirmed the diagnosis of her family physician.

When the specimen was examined it was easily seen and understood that the hemorrhage proceeded from the thin uterine wall. This process of distention and thinning of the uterine wall supplemented by the invasion of fetal cells, renders it all the more liable to rupture, much as in a chorioepithelioma. In this case the sensation imparted to the hand was like that of a thick-walled cyst. There was free blood between the gestation sac and the peritoneal coat of the uterus. The specimen was greatly changed in form after it was opened and the sketch shows what has been compared to the "blowing off by a shot gun" (Farrar).

My associate, Dr. Truman Abbé, has kindly made the accompanying sketch of the specimen.

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## MALIGNANT LEIOMYOMATA OF THE UTERUS.

BY

FRANK WARNER, M. D., F. A. C. S.,

Columbus, Ohio,

(With five illustrations.)

THE histological examination of clinically so-called uterine fibroids, under improved staining methods, has proven them to be leiomyomata. Instead of these tumors taking their origin from the fibroblasts of the connective tissue, they arise from smooth muscle cells. True fibroblastomata are usually found elsewhere in the body, as under the skin. Leiomyomata generally occur in the uterus, but may develop in the skin and elsewhere.

Sarcomas may take their origin in any part of the uterus, as the cervix, the fundus, or body, in this case developing from the fibroblasts of the connective tissue; or they may arise from smooth muscle cells, hence called leiomyomata.

Fibrosarcoma of the uterus occurs in infancy and the very young as a rule; leiomyosarcoma usually develops in a leiomyoma, conse-

quently occurring at a later period of life than the connective-tissue sarcomata.

The term leiomyoblastoma is used here to include both the benign and malignant forms of smooth muscle cell tumors.

In the preparation of this paper the author wishes especially to emphasize the fact that all "fibroids" are not benign and should, therefore, not be treated as such; remembering that all rapidly growing leiomyomata should always excite suspicion of their malignant nature. He would also urge a more careful anatomic and histologic study of every "uterine fibroid." When this is done it

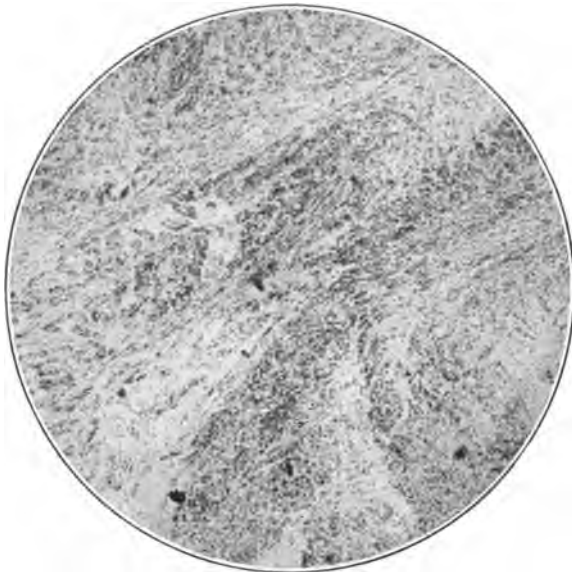


FIG. 1.—Typical schirrus leiomyoma—so called uterine fibroid— $\times$  low power.

will be found that malignancy is associated with them perhaps more frequently than has heretofore been thought to be the case.

Some diversity of opinion exists as to how frequently leiomyomata are associated with malignancy. McGlinn quotes Miller as saying that sarcoma occurs in 2 per cent. of uterine fibroids. He also quotes McDonald, in the same article, in which he estimates 3.7 per cent. of carcinomas complicating uterine fibroids.

Maroney makes the conservative estimate of 2 per cent. of sarcomas associated with uterine fibroids coming to operation.

The coincidence of carcinoma is apparently much greater than sarcoma in leiomyomata.

Hoffman has shown that with the census population of 96,765,576 in 1913, there were 76,319 deaths from cancer in Continental United States. Of this number, 11,776 were of the female generative organs. There is evidently no distinction made here between carcinoma and sarcoma, the two being grouped together; but the figures are sufficient to show the wonderful frequency of malignancy in these organs.

Better statistics will be possible when greater care is used to definitely determine the character of the neoplasm.

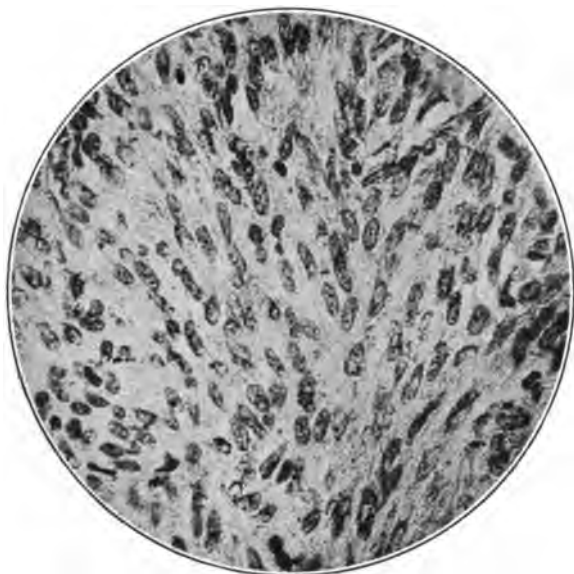


FIG. 2.—A more cellular area in a leiomyoma.

At the time of the operation upon uterine leiomyomata, evidence should be sought for malignancy association from the following standpoints:

1. Lack of encapsulation. A careful examination of the specimen may show an erosion through some point of the capsule, associated with which may present:
2. Evidence of infiltration of tissue outside of the capsule.
3. Invasion of neighboring lymphatics and of lymph nodes.

Subsequent to operation, the use of a special stain to show up the type of cell from which the growth has taken its origin, will always help to clarify the situation.

In looking for malignancy in any case of leiomyomata, the following points should be sought for:

1. The origin of the cell structure.

In one of the cases from which the pictures were taken, it was shown to have originated from smooth muscle cells.

2. In many cases, as in this one from which the pictures were taken, the cells may be of large and small spindle shape, and small and large round cells. Many of these cells lacked differentiation to an extent that no myoglia fibrils had as yet developed. After searching numerous fields, these were found on some of the better differentiated cells.

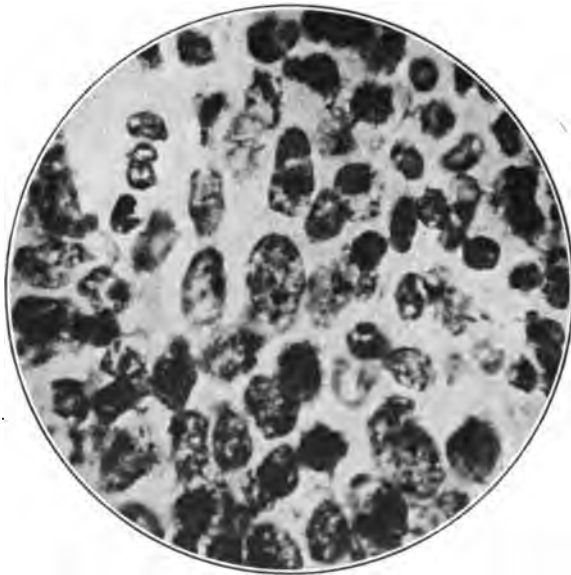


FIG. 3.—The variation in the cells of a leiomyosarcoma.

3. The very cellular structure of the growth was manifest as it is in neoplasms of this type.

4. Mitoses of cells is frequently seen in cases of this type, and it is always a strong argument in favor of malignancy. Some of the pictures show these mitoses from the case spoken of.

Whenever a uterine leiomyoma is found with groups of tissue which are very cellular, showing mitotic figures, and lack of differentiation of many cells, malignancy may be depended upon.

A rapidly growing leiomyoma should always excite suspicion of its malignant nature, leading one to think of a leiomyosarcoma.

Leiomyomata are usually slowly growing tumors, but even then

some of them are found later to be of a malignant type. The most scrutinizing examination of the entire tumor is frequently called for to find a malignant complication even when it exists.

There is great need of further data on the question of sarcomatous changes in leiomyomata.

The futility of the diagnosis of large spindle cell, small round cell, and large round cell and mixed cell sarcoma is quite manifest, as it means nothing but the shape of the cells, without a single reference to the derivation of these cells. Consequently, such terms are only confusing and give no inkling whatever as to the cell origin of the

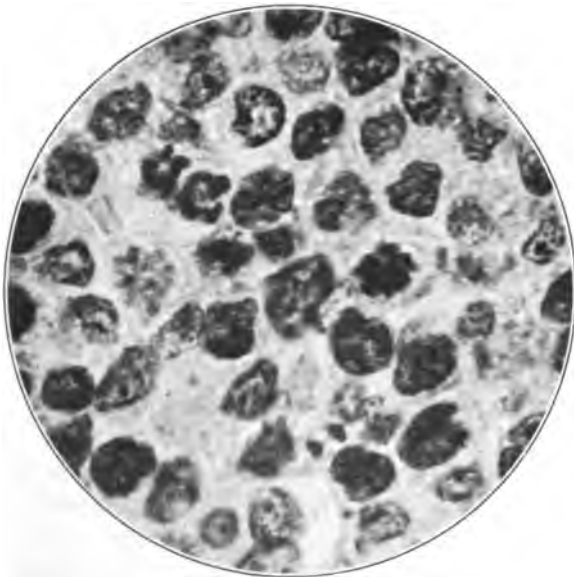


FIG. 4.—The variation and mitosis of the cells in a leiomyosarcoma.

new growth. These terms should be abandoned and the more exact ones of the cell origin substituted.

The importance of an exact histologic diagnosis cannot be overestimated in these cases, both for the patient in determining not alone the prognosis, but also in determining the question of a limited operation such as is sufficient for similar cases, or a more extensive operation such as is imperative in those complicated with malignancy, and for the community, for the need of accurate diagnosis is manifest to give better and truer data on which to study these problems.

Increased flow of the menses is one of the most common, as well

as earliest symptoms, of leiomyomata. This flow is not only increased in amount but prolonged in duration as a rule. One peculiar feature of the increased flow is that it occurs at the menstrual periods and not between them. When a menstrual flow occurs between the menses, it may be set down as due to some other cause. Excluding other causes for this intermenstrual flow, it may be looked upon as a very likely symptom of malignant association of the growth.

Pressure symptoms do not manifest themselves as a rule until the leiomyoma reaches sufficient size to impinge upon surrounding structures.

Frequently pain is an accompaniment of these uterine growths. This is especially true when the tumors are distributed through the uterine wall. This pain is usually only associated with the menstrual period.



FIG. 5.—Leiomyoblast showing myoglia fibrils.

One of the dangers always manifest in these growths is that pressure on the ureters occasionally produces a hydronephrosis. In a series of 100 cases, Kelly found two with this complication. In 1000 cases of myomas, the same author found cancer in twelve cases of the body of the uterus and sixteen of the cervix.

Operators have observed that heart lesions are frequently associated with uterine leiomyomata. McClellan and Grube think there is a connection of a causative type between the growth and the heart lesion. Associated with this are frequently vascular changes of a pronounced type, also a product of the uterine growth. They think that the cause is probably: "Mechanical interference with the digestive organs and resorption of the toxic substances from the colon."

It is frequently urged by some practitioners to let uterine leiomyomata alone, as they feel they are harmless, but here is another reason why they should be removed, in addition to the development of malignancy.



Usually the gross characteristics of uterine leiomyomata are sufficiently well defined to make no error in their nature, but one should never be satisfied with a superficial examination, for a thorough microscopical examination will occasionally detect early malignant change where it had not been dreamed of. These growths are spherical or roundish, well encapsulated, multiple in number, and situated just beneath the mucous membrane, in the muscular substance, or just beneath the peritoneum. Hence their classification into submucous, interstitial, or subperitoneal fibroids.

These growths are of mesenchymal origin and they have the smooth muscle cell as the unit of their production. These cells can always be differentiated by special staining, and it is only in this way that they are differentiated from those tumors of fibroblastic origin, as true fibroids of the ovary and elsewhere.

It is a curious fact that the first thing these newly formed leiomyomatous cells do is to increase the production of fibroblasts. This is so prominent in some cases that the collagen and fibrilogen fibrils are so numerous as to produce an atrophy of the muscle cells to an extent that the fibroblasts are finally left in greater numbers than the cells of the leiomyoma themselves. Then it gives the growth the appearance, even microscopically, of being fibroblastic in origin. A closer study shows the true nature of the trouble. In this excessive stimulation of fibroblastic production, with its associated collagen and fibrilogen fibrils that gave the clinical name of fibroids to leiomyomata.

This same line of conditions occurs in adenomas of the breast.

Scirrhus cancer of the breast is a notable example of the stimulating power of the lawless epithelial cells to the formation of fibrotic tissue. An opposite example is medullary carcinoma of the breast, which produces very little supporting tissue. In this variety, however, the mitoses are so rapid as seemingly to give very little time or opportunity to stimulate fibroblastic formation with its consequent connective tissue.

Tyzzar observes that: "The histological study of tumors also discloses reactions of the surrounding tissue, some of which are unquestionably favorable, others distinctly unfavorable to the growth of the tumor tissue. In other instances proliferative changes in the supporting tissue are most marked. This is seen in adenomata of the breast and in the papillary tumors of the ovary. The proliferation may be present in such a degree as to give the appearance of mixed tumor or sarcoma."

Mallory says: "Tumor cells seem unquestionably to incite in

some way a proliferative activity on the part of the fibroblasts. Some kinds of cells exert a greater influence than others. In general it may be said that tumor cells obtain about the same amount of connective tissue as subtends normal cells of the same kind. For example, in the epithelial tumors, the epithelium of the mammary glands and ducts are subtended by a large amount of connective tissue. The epithelial tumors of the breast cause an abundant connective tissue stroma to be formed. On the other hand, the adrenals contain very little connective tissue and tumors of the adrenals cause the production of very little connective tissue."

In short, the situation, the rapidity of growth of a malignant or nonmalignant tumor, seems to determine to a considerable degree the amount of fibroblastic stimulation which results in the formation of much or little connective tissue.

Any case of leiomyosarcoma well illustrates, as can be seen in one of my cases from which the photomicrographs were made, the utter uselessness of continuing to name sarcomas by the shape of the cells. In this case the photomicrographs show large spindle cells, small spindle cells, and large and small round cells. The essential feature of the case is to prove the type of the cells or the tissue from which they are derived. This is done by cutting sections of the growth and using the differential stains of phosphotungstic acid, or analine blue, which show the myoglia fibrils originating from the muscle cells, and which are shown in the pictures.

The tumor from which the sections were made for pictures was from a patient, aged forty-five, operated on by me August 26, 1913, for clinically so-called fibroids of the uterus. A panhysterectomy was made because it was seen at the operation that the tumors were complicated with malignancy.

Subsequently the writer made a detailed study of the histological structure of the growth, especially with reference to determining the origin of the malignant cells composing the neoplasm. This study proved, by the staining and tests indicated above, the clinical fibroids to be leiomyoma, and the cells of the malignant neoplasm to have originated in smooth muscle cells.

#### CONCLUSIONS.

1. Clinically so-called uterine fibroids are leiomyomata.
2. Leiomyomata are derived, as the name indicates, from smooth muscle cells; these newly formed cells stimulate the development of fibroblasts with excessive growth of collagen and fibrilogen fibrils from them. The subsequent contraction of the newly formed con-

nective tissue may be such as to destroy, largely, the muscle cells, giving the growth the appearance of being a true fibroid tumor.

3. The tendency of all leiomyomata is to form in definitely encapsulated areas; when numerous cells break through this encapsulation, the growth is suspiciously malignant.

4. About 2 per cent. of cases of leiomyomata are associated with malignancy of a sarcomatous type; while carcinoma complicates them in about 4 per cent. of cases.

5. It is dangerous practice to consider all leiomyomata benign; many may be found at operation to be associated malignancy.

6. Sarcoma is a disease of infancy and early childhood in the main; leiomyoma occurs most frequently between the third and fourth decades of life.

7. A rapidly growing leiomyoma should excite suspicion of malignancy.

8. A thorough study of leiomyomata subsequent to operation is needed to determine the question of malignancy.

9. To differentiate a leiomyoma from a true fibroid tumor, a differential stain, such as phosphotungstic acid, is needed to bring out the myoglia fibrils of the muscle cells as well as the collagen and fibrilogen fibrils of the fibroblasts.

10. Any sort of malignant cells may assume the shape of spindle cells, or round cells, large or small. Consequently it would be preferable to name the neoplasm, in the case of sarcoma, fibrosarcoma, etc., rather than round- or spindle-celled sarcoma.

11. Increased flow of menses at the periods is a symptom of leiomyomata, but a flow instituting itself between periods points to other causes, frequently malignancy.

12. To leave leiomyomata unoperated upon, always exposes the patient to the danger of malignancy engrafting itself upon the growth, if indeed the tumor is not already malignant.

13. The extent and degree of malignancy of a leiomyosarcoma is determined by the extent to which the growth has broken through the capsule, the surrounding infiltration, the presence of mitotic figures, the poorly differentiated cell structure, and the invasion of lymphatics or lymph nodes, as well as the pinkish appearance of the growth revealed on section.

I am indebted to Dr. Ernest Scott, Professor, and Dr. Jonathan Forman, Assistant Professor of Pathology in the Medical Department of the Ohio State University, for courtesies extended in the preparation of this paper and the execution of the work done by me in the laboratory during my study of the subject of malignancy in uterine leiomyomata. The author wishes to extend his thanks to them and to Dr. Carl C. Hugger, of the Department of Pathology, who made the photomicrographs of the slides used to illustrate the paper.

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- 10 WEST GOODALE STREET.

## HEMANGIOENDOTHELIOBLASTOMA IN PREGNANCY.\*

REPORT OF TUMOR WHICH REPEATEDLY GREW LARGER DURING  
GESTATION, BECAME SMALLER AFTER PARTURITION  
AND RECURRED AFTER REMOVAL.

BY

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(With two illustrations.)

THE curious increase in size of a hemangioendothelioblastoma of the jaw of a young negress during her pregnancy and its decrease in size after parturition, with a repetition of the phenomenon three times and a recurrence of the tumor once after removal, have been sufficiently unusual to warrant a report of this case. Under the heading, "Tumors, angiomatous," in the Index Medicus, there is no title hinting at such a condition from 1903 to date. This patient was admitted to the female surgical colored ward of the Louisville City Hospital on the service of Dr. Price. Her case record in brief is as follows:

K. W., colored, twenty-two, married. Menses began at fourteen, are regular, last three or four days, with intervals of four weeks. Two children living and well, age one year and fourteen days respectively. Twins stillborn after instrumental delivery. History otherwise irrelevant.

*Present Illness.*—Three and one-half years ago, in June, 1910, at the age of eighteen, when patient was three months' pregnant, she noticed for the first time a red growth which appeared behind the incisor

\* From the Pathological Laboratory of the Medical Department of the University of Louisville and of the Louisville City Hospital.



**Hemangioendothelioblastoma of upper jaw. Note spreading of teeth.**



teeth in the upper jaw at the margin of the gums and teeth. The growth grew forward between the teeth and then laterally to the first molar during the pregnancy. After she was delivered the size of the growth subsided somewhat. In October, 1911, it was removed with cautery. It did not recur until she had become pregnant for three months a second time in 1913, although she says the gums were redder at the side of the tumor, more so than in the normal region. The tumor grew rapidly until she was delivered in November, 1913. After confinement the tumor again subsided and there was no increase in size until she was pregnant three months a third time in May, 1914, after which the growth again grew rapidly and extended

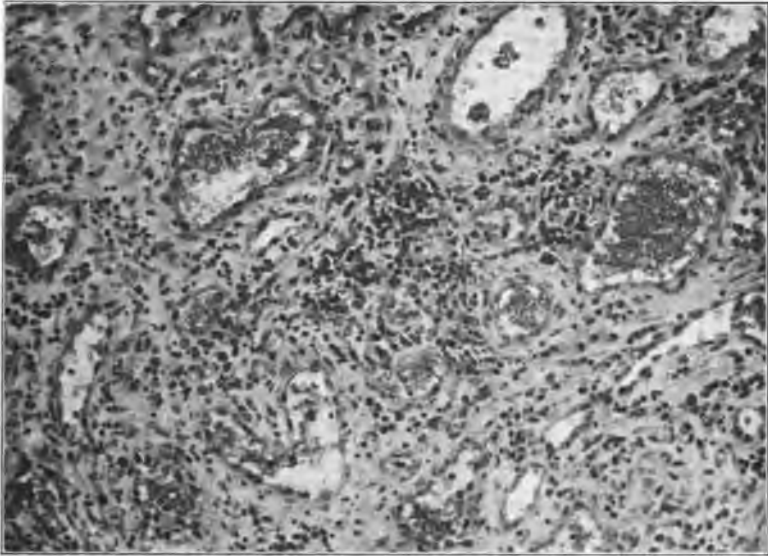


FIG. 1.—Hemangioendothelioblastoma.  $\times 200$ .

from the incisor teeth beyond the wisdom teeth on both sides, especially on the right side. The growth has subsided a little since she was delivered fourteen days ago.

*Physical Examination.*—Negative except for the presence of the tumor in the mouth. Examination of the mouth shows a firm vascular mass the size of the thumb extending from the left upper incisor to the right upper wisdom tooth and smaller masses present between the teeth of the left side. The growth is confined to the superior maxilla. It seems attached at the junction of the teeth and the gums and extends between the teeth on the inside and outside of the teeth so that many of them are completely covered by the growth and all are loosened in their sockets. The tumor bleeds easily on trauma. The anterior portion shows slight pressure necrosis. The necrosed area is grayish and the size of the thumb nail. The central incisor teeth are very widely separated by the growth between them.

At operation the growth was excised as far as possible and the remainder was removed with the actual cautery. Electric cautery knives were used on the mass between the teeth. The patient refused to have her teeth removed and more radical methods could not be used. An examination a week after operation showed bright red nodules at the base of the upper right wisdom tooth and between the upper central and left incisor teeth. These buds were the size of a pin-head.

The specimen was sent to the pathologist with a diagnosis of angioma. The laboratory record of the examination follows:

*Gross Description.*—Specimen consists of several pieces of rather soft tissue, red to pale gray, covered on one side with thin epithelium. Largest measures 3 cm. in greatest diameter. On section the larger pieces are pale gray, moist, glistening, homogeneous.

*Microscopical Diagnosis.*—Hemangioendothelioblastoma. Acute and chronic inflammation.

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## TRANSACTIONS OF THE AMERICAN ASSOCIATION OF OBSTETRI- CIANS AND GYNECOLOGISTS.

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*Proceedings of the Twenty-ninth Annual Meeting Held at  
Indianapolis, September 25 to 27, 1916.*

*The President, HUGO O. PANTZER, M. D., in the Chair.*

### DIVERTICULITIS OF THE DESCENDING AND PELVIC COLON.\*

BY

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ONLY within the last decade has our attention been directed to diverticulitis affecting the lower colon. During this period the pathology of the condition has been carefully studied and we have, in consequence, to-day a clear conception of the pathological changes that take place. The surgical treatment of diverticulitis of the descending and pelvic colon requires further study and elucidation. There are several problems that remain to be solved, and to these we shall direct your attention.

Should we resect the diseased intestine in the majority of cases, and if so, what is the most desirable method of procedure in this location?

Should we be content with opening and draining an abscess, due

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.



to diverticulitis or, should we remove one or more of the diverticula present and close the opening in the bowel?

How should we proceed when we have an opening between the colon and the urinary bladder? Should we advocate colostomy above the diseased area and thus allow the subsidence of the inflammation, which so often has acute exacerbations?

A diverticulum is either congenital or acquired. It may be complete, involving all the coats of the intestine; or partial, affecting the mucous, submucous, and peritoneal coats alone.

Acquired diverticula are usually partial or false. They consist of a hernial protrusion of the mucous coat through the musculature of the intestine and are covered by peritoneum. Diverticula are found in any portion of both the small and large intestine. Those of the small intestine are, as a rule, of congenital origin; while those found in the descending and pelvic colon are usually acquired. The fact that the descending and pelvic colon is derived from the primitive hind gut, may account for this difference.

In studying the pathology of the pelvic colon, it is interesting to consider briefly its embryological origin. It is derived from the hypoblast and mesoblast of the ovum, and the mode of development is as follows: When the embryo has reached the stage of development in which we find the neural canal formed and after the three layers of blastoderm have folded in, forming the head and "foregut," there is manifest, at the blind end of the enteric groove, a protrusion, which, eventually, develops into the hindgut or rudimentary rectum.

Up to the sixth week of gestation the large and small intestine constitute one cavity of practically uniform caliber, with the exception that the lower portion of the hindgut is a little more capacious. The colon, sigmoid and rectum increase in circumference more rapidly than the foregut, or small intestine, and more and more nearly approach the outer layer of the mesoblast and epiblast at the lower portion of the embryo.

Diverticulitis of the descending and pelvic colon is due to an infection in the walls of one or more diverticula. A diverticulum is the result of a pouching of the mucous membrane, through small portions of the colon. Fecal concretions accumulate in the diverticulum and produce ulceration, thus allowing bacteria to enter its walls, and setting up an acute or chronic inflammation of the surrounding structures.

The walls of a diverticulum have been found to consist of the following coats: The mucosa, which is found definitely atrophied near

the proximal end of the lumen, where pressure has been greatest from the thickened intestinal wall; the submucosa or fibrous coat, which is thicker in the proximal than in the distal portions, and the circular and longitudinal muscular fibers which have been found thickened by fibrous infiltration to twice their normal thickness. The diverticulum itself seldom contains any longitudinal or circular muscular structures. They frequently contain hard, black, fecal concretions. Usually the walls of the diverticulum show evidence of a chronic inflammation in the mucous and submucous coats, the latter abounding in fat.

There is a hyperplasia of all the adjacent glands. The large inflammatory mass is caused by bacterial invasion through the walls of a diverticulum, resulting in peritonitis and inflammatory deposits. Fecal concretions frequently are a source of chronic irritation, and produce a secondary peridiverticulitis, which may be attended by the formation of an abscess.

The majority of cases are found in males over fifty years of age, who have a tendency to obesity, although two cases have been reported; one aged five, and the other twenty-two years.

Constipation is known to be a predisposing factor. It is thought that where the blood-vessels enter the wall of the intestine, weak points in the wall of the bowel were produced, thus allowing hernia of the mucous membrane through the muscular coats. However, if this were so, we should find these diverticula at the mesenteric border, while diverticula are found in any portion of the bowel, even directly opposite the mesentery. Tension from within, due to gases, and traction from without, due to the mechanical pull of adhesions have been cited as causes in the production of diverticula. Evidently there is some weakness or loss of muscular tone in the muscle wall of the intestine to permit a protrusion of the mucosa through the muscular walls.

The symptoms, as a rule, are of sudden onset, with severe pain in the left iliac region, characteristic of a localized peritonitis; this may be followed by nausea, but seldom by vomiting. The symptoms are oftentimes spoken of as similar to those found in appendicitis; but localized on the left side, rather than on the right.

There is rise in temperature; localized tenderness on pressure; muscular rigidity, and a sense of resistance or a tumor mass can be felt to the left of the median line in the lower quadrant of the abdomen. At times, we have vesical tenesmus and frequency of micturition. There is an increase in the leukocytes, especially of the polymorphonuclear type.

The patient is suddenly attacked with severe pain in the left side, and later there may appear a definite tumefaction in the left iliac region. Upon deep palpation there is a sense of resistance, and the patient has a feeling of tenderness on pressure. The acute disturbance is likely to subside, to be followed later by recurrent attacks. We may have the formation of an inflammatory mass, due to periverticulitis, producing inflammatory thickening and adhesions to the surrounding parts.

Intestinal obstruction may be due to an inflammatory mass, resulting in angulation which constricts the lumen of the intestine. An abscess may form and necessitate opening through the abdominal wall, or the abscess may perforate into the bowel or the bladder, or a fecal fistula may result. These cases have been frequently diagnosed as carcinoma; even after the gross specimen has been examined following resection and proved to be diverticulitis only on microscopic examination.

The occurrence of blood in the stools is an important sign in favor of carcinoma, while the absence of blood would lead one to suspect diverticulitis. We should bear in mind also the possibility of tubercular or syphilitic disease.

A proctoscopic examination is of negative value except, in very rare cases, where intussusception has occurred. Cases thought to be carcinoma, in which colostomy had been performed, have lived for years and, in all probability, were instances of diverticulitis rather than malignant disease. The disease may be acute or chronic and many times it is of long duration. We may have perforation of the diverticulum with the formation of an abscess or a fecal fistula may result.

The most difficult complication we have to contend with is one where the diverticulum has become adherent to the bladder, and a perforation has taken place into that viscus, allowing gas or fecal matter to enter the same. We should not overlook the fact that diverticula have been known to undergo malignant degeneration.

A difference of opinion exists in regard to the efficiency of a roentgenological examination in the differential diagnosis of diverticulitis. According to Russell D. Carman of the Mayo Clinic, cases in which the diagnosis can be based on x-ray findings are extremely rare, and Schwartz of Vienna, in his monograph "Röntgen Diagnosis of the Colon," makes absolutely no mention of diverticulitis.

On the other hand, Case refers to thirteen diagnoses of diverticulitis made by him in the last few years of his roentgenological experience; but Abbe and Le Wald cite a case in which it was impossible to

differentiate between diverticulitis and colonic neoplasm, even with the most refined *x*-ray methods.

According to Case, there can be seen in diverticulitis, after an opaque meal has been given, small rounded shadows in the affected areas, these being the residue of the opaque salts retained in a diverticulum. He mentions as identifying features the fact that these shadows always appear in groups and always maintain the same relation to each other, and states that they are best seen on the second or third day, and often show to better advantage after a barium enema has been given.

Carman points out that it is impossible to differentiate between a carcinoma and a diverticulum, inasmuch as there is present in both conditions a similar filling defect with an opaque meal, and he further states that ureteral stones, phleboliths or calcified glands give shadows, which are almost indistinguishable from those of barium-filled diverticula.

To overcome in part this difficulty, he advises a screen or plate examination before the enema is given. He considers the antero-posterior view the best, inasmuch as diverticula usually occur near the mesenteric border of the bowel, at the point where the vessels enter, but suggests that as this is not always the case, screen and plate examinations be made at various angles of observation and advises also stereoscopic röntgenograms. He prefers the liquid enema to the opaque meal, on the ground that the former is more likely to fill the diverticulum and thus show it, while the latter is likely to scatter more or less through the bowel.

We believe that the röntgen examination will be of decided value in the majority of cases. One can eliminate appendicitis on the left side by a röntgenological examination, which would show the position of the cecum and possibly the appendix.

The surgical treatment consists in making a long left rectus or a muscle-splitting incision, similar to the McBurney, in the left iliac region. Through this opening the abscess may be drained, and in some instances the diverticulum removed, and the opening in the bowel closed. The diseased portion, which is usually not more than from 3 to 8 inches in length, may be excised and an end to end or lateral anastomosis made, or, the two stage operation may be employed, as follows: Withdraw through the wound a loop of the bowel containing the affected area and stitch together the walls of the normal bowel above and below this mass. The parietal peritoneum is then sutured to the two portions of bowel below the loop of intestine withdrawn. The diseased area should be removed with a cautery in

about forty-eight hours. The openings in the intestine may be closed at some future time.

Should we find a fistula between a diverticulum and the urinary bladder, which is attended by the passage of gas and feces through the urethra, we should make a careful cystoscopic examination to determine the size and location of the opening in the bladder. After opening the peritoneal cavity, the colon and diverticulum are separated from the bladder, and the opening in the latter closed. The involved colon is then resected immediately, and an end to end or lateral anastomosis made, or the two stage operation may be resorted to. A lateral anastomosis is to be preferred to an end to end, on account of the greater tendency in the latter operation to leakage at the mesenteric border, due to the liquefaction of the fat between the leaves of the mesentery.

It is found desirable in certain cases, first to perform a colostomy above the diseased area to allow the subsidence of the inflammatory process, thus relieving this field of constant irritation, due to the passage of feces. We can then attack the disease with greater success at some subsequent period. One should not attempt too much at the primary operation; we are, usually, dealing with an acute infectious process.

CASE I.—During the month of March, 1912, J. E., a male, aged forty years, with a tendency to obesity, had an attack of pain across the lower abdomen. There was no nausea or vomiting. He took a cathartic and went to his office. As the pain continued, he returned home at 5 P. M., took a dose of castor oil and went to bed. After his bowels moved, he felt better; but the pain returned again about midnight. He sent for a physician who said he had "inflammation." He remained in bed three days, and then resumed his work and felt well until September 8, 1912, six months later, when he complained of soreness in the left iliac region. His physician prescribed pills and enemas and, as he felt better, he went on an automobile trip for four days. He was able to attend to his business subsequently, but felt discomfort in the left lower abdomen. He then consulted a surgeon, who said he found "a bunch there." His physician thought he had a rupture and referred him to me September 28. The patient said he had been having night sweats. His temperature was 100°, and pulse 96. A mass, tender on pressure, was palpable in the left iliac region, and a diagnosis of probable diverticulitis of the colon was made.

Operation September 29, 1912. An abscess, containing foul-smelling pus, was opened and drained for eight weeks. Small amounts of feces were discharged from the wound from time to time. The wound healed over; but during the next two years it became necessary to reopen it several times. The discharge each time contained

pus and feces. Finally the wound closed. The patient regained his former weight and was able to attend to his business the greater part of the time. A mass could still be made out in the left iliac region, and I advised its removal; but, as he was "feeling well," he said he thought he would "let well enough alone."

On August 1, 1916, he commenced to have pain over the bladder region, and about August 20, he passed gas through his urethra. I saw him September 6. His urine contained pus and fecal material. A cystoscopic examination revealed a small opening in the bladder.



FIG. 1.—Bismuth-filled dilated rectum. Obstruction at pelvic colon.

There was redness, tenderness, and swelling at the site of the former operation.

September 7. Operation: Scar excised, pus and feces removed from a cavity 3 inches deep. The wound was thoroughly curetted and drained.

September 18. Left inguinal colostomy above the diseased area was performed to relieve the irritation from the feces, and give the inflammatory mass an opportunity to subside.

CASE II.—January, 1907, B. S., male, aged fifty-two years, weight 200 pounds. Has lost 26 pounds. Last August, while taking

a shower bath, he was seized with pain in the lower abdomen, attended with nausea. He thought it was due to something he ate during the hot weather; but he has had more or less discomfort from time to time in the left lower quadrant. Two weeks ago he again complained of more acute pain in the left iliac region. I had him under observation for a period of one week. He had a tendency to constipation, and a feeling of discomfort in the left iliac region. Local tenderness on pressure; a sense of resistance, and the suspicion of a mass beneath this area. Rectal examination was nega-



FIG. 2.—Barium filling diverticula.

tive. Blood examination negative. Previous to that he had a slight chill and elevation of temperature. A diagnosis of probable diverticulitis, with a possibility of carcinoma or a left-sided appendix, was made by three different surgeons. Seven inches of the bowel found involved and resected by another surgeon, and an end to end anastomosis was made. He died on the thirteenth day of peritonitis, probably due to leakage at the site of the mesentery.

CASE III.—Mr. O. L., patient of Dr. F. V. Hussey, male, aged twenty-six, a Swede by birth. No history of tuberculosis or cancer in the family. Nothing remarkable in his past history excepting

typhoid fever two years ago. Present illness dates back one year, when patient began to have intermittent griping pain across the lower part of the abdomen, with increasing constipation. Pain predominated in the left iliac region and across the sacral region posteriorly. Stools gradually became diminished in size and the pain, colicky in character, became more severe. For the last two months there has been, occasionally mucus and streaks of blood in the stools. There has been progressive loss of flesh and strength.

Patient was seen in consultation August 16. A mass, about the size of an egg, could be made out in the left iliac region; it was soft in

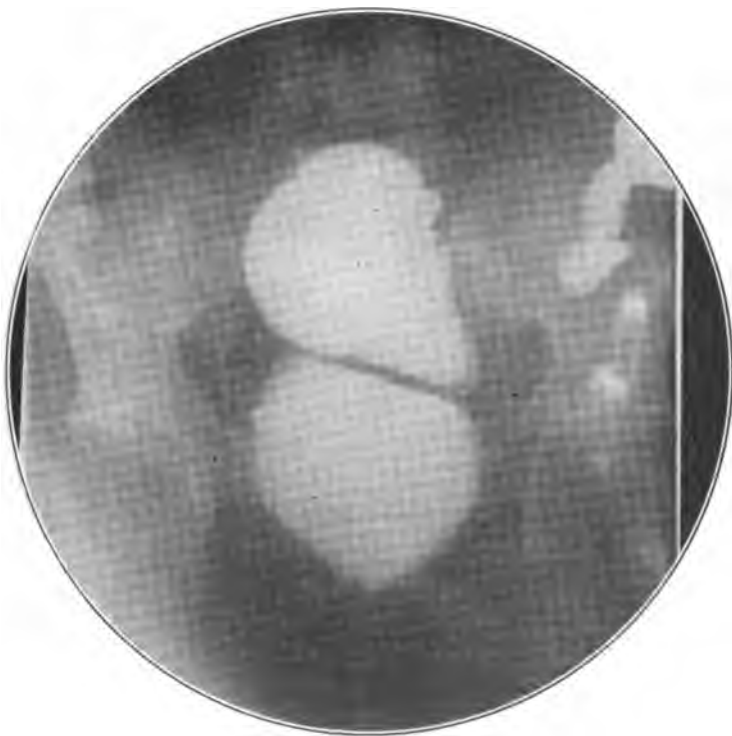


FIG. 3.—Barium enema. Dilated rectum. Obstruction at lower border of pelvic colon.

consistency and movable. Nothing could be made out by rectal examination. Operation was decided on and the patient sent to the hospital. A bismuth enema was given and x-ray pictures taken which showed a mass at the lower extremity of the sigmoid with clean-cut edges and narrowing of the lumen of the sigmoid to about  $\frac{1}{2}$ -inch.

An exploratory operation was done the following day. A firm, hard mass was found involving the lower part of the sigmoid and upper portion of the rectum; it was very firmly attached to the sac-



rum and left iliac bone. The left iliac vessels were involved in the mass. No enlarged glands could be felt. The mass, which was felt in the left iliac region before the operation, was a fecal accumulation in the sigmoid, proximal to the growth and not the growth itself.

Owing to the condition of the patient a removal of the growth was not attempted at once; but a loop of the sigmoid was brought up into the wound, which was a left rectus one, sutured to the margin of the peritoneum and the wound closed. Owing to the difficulty of obtaining a section of the growth, it was not considered wise to make the attempt. A tentative diagnosis of diverticulitis was made; realizing at the time, of course, that the growth might be malignant. The patient made an excellent primary recovery and, on the second day following the operation, the loop of bowel was opened and drainage established.

On the eighteenth day following the operation the patient began to have griping pain across the lower part of the abdomen with very little drainage from the colostomy wound. The condition became rapidly worse. The patient began to vomit and the obstruction became complete. The abdomen was again opened, this time through the right rectus muscle, and a loop of the ileum was found caught down at the brim of the pelvis by a band of adhesion causing a complete obstruction at that point. The band of adhesion was divided and the loop of bowel freed. The wound was closed in the usual manner and the patient made an uneventful recovery.

In conclusion, we would emphasize the following points: The symptoms found resemble those of appendicitis, but with the local manifestations on the left side. The value of röntgenological examination. The importance of differentiating diverticulitis of the colon from carcinoma, tuberculous or luetic growths. Do not attempt too much at the primary operation. The two stage operation is often preferable. Temporary colostomy may be desirable. Conservative surgery is of the greatest value in this disease.

262 BLACKSTONE BOULEVARD.

#### DISCUSSION.

DR. O. H. ELBRECHT, St. Louis, Mo.—The subject chosen by Dr. Keefe deals with a condition that is comparatively new and perhaps one of the most interesting clinical chapters that has developed in recent years. If you will review the literature you will be fascinated by its pathology. The first complete article published in this country was by Sir Maxwell Telling of London and appeared in the *Proctologist* in 1910.

Telling made a most careful study of the gross and microscopical pathology, also the clinical side of it. He showed that it was a herniation of the mucous membrane of the large bowel through the interlacing muscular fibers into the peritoneal coat and that it could exist anywhere from the cecum to the rectum. The most common seat of the disease, however, seems to be the sigmoid with a special

selective affinity for the spaces under and into the fatty epiploica. When fecal concretions escape into such herniations they present a clinical picture identical with acute appendicitis excepting the fact that the disease is located in the left lower quadrant instead of the right. If rupture does not occur and they escape general peritonitis but instead a chronic inflammatory process with much induration and infiltration results. This after a long period develops into a small tumor resembling carcinoma. This is usually constant and is practically the only clinical evidence found between acute attacks.

In differentiating from carcinoma you will find that it does not produce emaciation or hemorrhage even though there is a marked stenosis of the lumen of the bowel. It is also more common in obese subjects afflicted with constipation and this is given as one of the causative factors as there is a large amount of fat on the bowel which weakens the musculature and thus permits the herniation to take place. Whenever you examine a patient with a tumor in this region you must keep this condition in mind, more especially in healthy looking subjects with constipation. I shall not attempt to mention the many complications that can occur as the time allowed me would not be sufficient, but merely ask you to read Telling's article which will prove intensely interesting and give you a thorough understanding of this new pathology.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—May I ask Dr. Keefe whether this man was given bismuth by mouth?

DR. KEEFE.—Yes, he was.

DR. BAINBRIDGE.—How many hours after the ingestion of the bismuth was the picture taken? These questions are very important for us to have on record because this is such an important subject, and many of us believe it is absolutely the end result of a chronic intestinal stasis above Lane's kink, and I would like the record to show the points of time of these things in order that we may interpret the x-ray correctly.

DR. KEEFE.—It was taken twenty-four hours after a barium meal.

DR. BAINBRIDGE.—With reference to this line running down to it, would you interpret that as the small or large bowel? You have stasis in a mobile cecum and with a band across here. Is that in the small bowel? If it is, it is one of the most pronounced cases of intestinal stasis from an x-ray standpoint that I have seen. Is that obstruction, Dr. Keefe, entirely above the Lane's kink—in other words, above the brim of the true pelvis?

DR. KEEFE.—It looks to me it is about at the brim of the pelvis.

DR. BAINBRIDGE.—It is above the Lane's kink.

DR. KEEFE.—Above the brim of the pelvis I should say.

DR. BAINBRIDGE.—These two points are established as a secondary condition.

DR. KEEFE.—I merely wish to emphasize the fact that we should bear in mind that there is such a disease and be on the lookout for it. We should not say everything in the left iliac region is cancer, because many of these people can be relieved, and if we are in a position to diagnosticate them early, we may have better results

than if we wait, we have a mass as large as two fists in the left iliac region.

It was my hope that we would elicit some discussion with reference to the advisability of different methods of procedure.

The first specimen I saw was at the Mayo Clinic. I was told that Dr. White, of Philadelphia, Professor of Surgery, who has died since, went there and had this mass excised, and Dr. Will Mayo thought it was a carcinoma; but Dr. Wilson, his pathologist, on making a serial section found it was diverticulitis, and I saw that specimen. That I think was the first case they had had of diverticulitis.

The primary operation of an end to end anastomosis seems to be a dangerous one as the mortality has been very high. It would seem to me that a two stage operation would be far preferable. It is better to have a patient alive, although he may have some disturbance, than to have him die from too much surgery done at the first operation.

With reference to colostomy, there is a great difference of opinion about it. Some men would just as soon be dead as to have a colostomy done. I have a patient, a doctor's wife, with intestinal obstruction on whom I operated in the country at one time, some six years ago, and she recovered from that temporary obstruction of the bowel, and I suggested later that we try and close that and remove the diseased area, but she said no; it does not cause me great disturbance. I have examined her from time to time. This woman's husband practices in the country; she drives several miles to a railroad station, attends store all day, returns at night, and drives to her home.

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## THE TECHNIC OF ABDOMINAL HYSTERECTOMY.\*

BY

J. F. BALDWIN, A. M., M. D., F. A. C. S.,

Surgeon to Grant Hospital, etc., Columbus, Ohio.

(With thirteen illustrations.)

THE technic of hysterectomy has been a matter of steady evolution. The principles of the operation have been long established, but there are little details which have not been brought out and which may add materially to the satisfaction of the operation and to its safety. Most operators have felt that an abdominal panhysterectomy was considerably more difficult, and had a materially higher mortality, than the subtotal or supravaginal operation. By the technic which I have finally developed, as the result of 2018 operations for the removal of the uterus, I feel that the complete removal is almost as simple, and fully as safe, as the less com-

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

plete procedure, while it entirely removes the possibility of malignant changes in the retained cervix, and more or less morbidity from inflammatory or degenerative changes which may be present, or which may occur, in the part that is left behind. The steps of the operation are as follows:

1. Thoroughly wash out the vagina with soap and hot water. This is done when the patient is under the anesthetic, and advantage should be taken of the opportunity to make a more thorough examination of the pelvic organs than was, perhaps, possible without anesthesia. Seize the cervix with a volsella, and fill the uterus

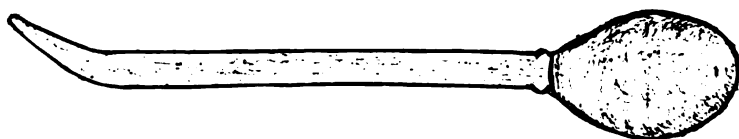


FIG. 1.—Glass tube with bulb for injecting iodine into the uterus.

with full strength tincture of iodine by means of an appliance, made for this purpose, shaped something like a large medicine dropper (Fig. 1). The iodine should be applied as well to the outside of the cervix. The cervix, which had been pulled down somewhat to steady it, is now pushed up, and by means of a feeding cup (Fig. 2) an ounce or two of tincture of iodine, reduced to one-fourth its normal strength, is poured into the vagina. By a sort of pumping motion with the volsella this iodine is spread over the walls of



FIG. 2.

the entire vagina. The volsella is then removed, and by means of gauze the excess of iodine is wiped out of the vagina.

2. Open the abdomen by the usual incision, place the patient in the Trendelenburg position, and wall off the intestines by gauze sponges. The uterus is seized by a tumor clamp and thoroughly pulled up, so as to bring the cervix as close as possible to the abdominal wall. A hysterectomy clamp (Fig. 3) is placed on the infundibulo-pelvic ligament, just outside the right ovary (I always stand on the right side of the patient) and a second clamp is placed at the

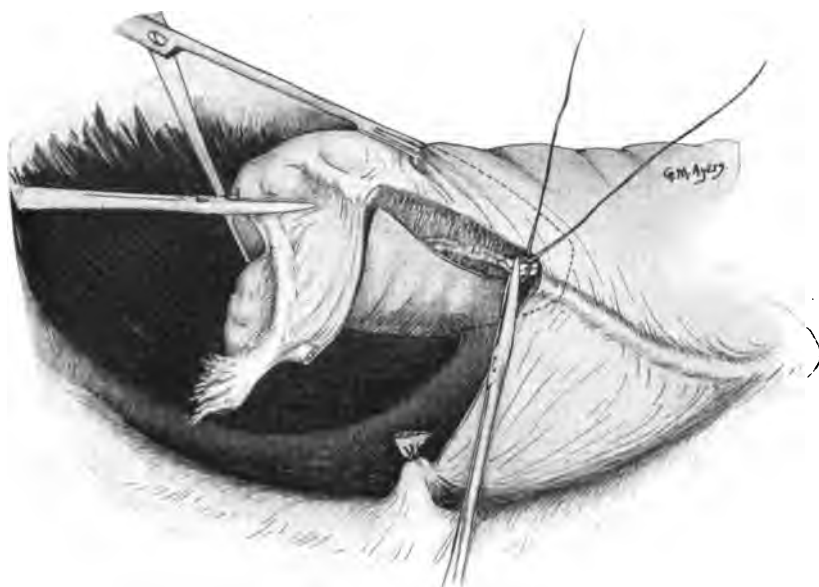


FIG. 3.—Cutting and ligating right infundibulo-pelvic ligament.

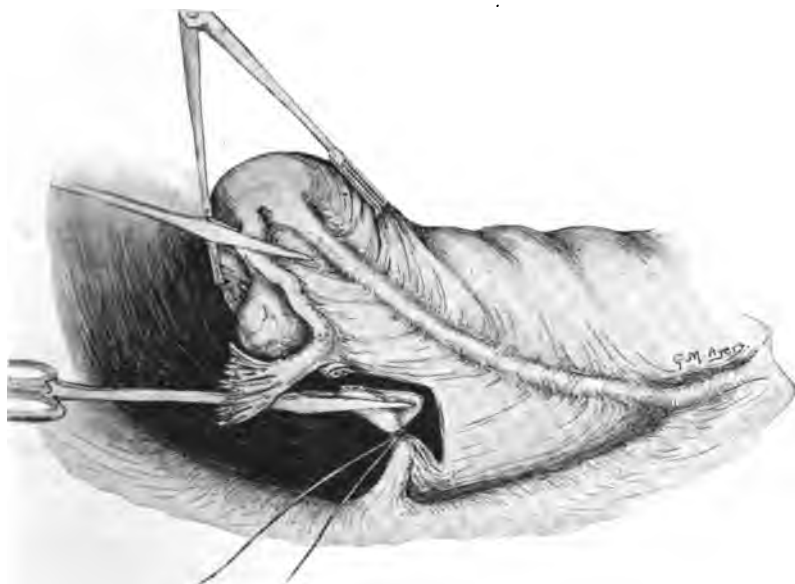


FIG. 4.—Ligating uterine artery. No bleeding from round ligament.

horn of the uterus so as to catch the uterine artery at that point. An incision is made inside the first clamp, the scissors turning at a right angle at the end of the clamp so as to cut back, for a ligature, the tissues between the point of the clamp and the round ligament. (If an ovary is to be saved the first clamp is applied so as to catch the ovarian ligament and the Fallopian tube close to the uterus. Later the tube is detached from the ovary and a ligature applied.)

3. Cut the round ligament close to the uterus, and dissect the

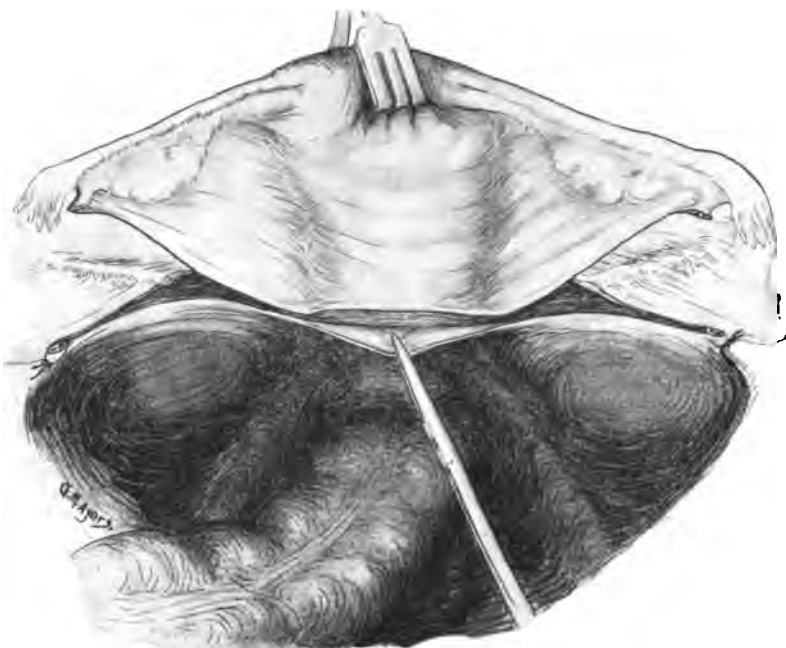


FIG. 5.—Peritoneum incised above uterosacral ligaments.

parts down to a point corresponding to the internal os. This exposes the uterine artery which is caught with a hemostat (Fig. 4) and cut. The same maneuver is executed on the opposite side.

4. Ligatures are applied to the ovarian and uterine arteries, and the clamps removed. Four ligatures have controlled hemorrhage. There is no hemorrhage whatever from the cut end of the round ligament—notwithstanding that all of our text-books show the round ligaments carefully ligated as though hemorrhage would otherwise take place.

5. The uterus is pulled forward, and with scissors the peritoneum is incised transversely just above the point of attachment of the

utero-sacral ligaments (Fig. 5), and dissected down for half or three-quarters of an inch, being careful not to button-hole it. This peritoneal flap is then caught with a hemostat so as to hold it out of the way.

6. The uterus is pulled backward, and the peritoneum from in front of the cervix is carefully dissected down with scissors, carrying with it the bladder. The vagina is freed by snips with the scissors

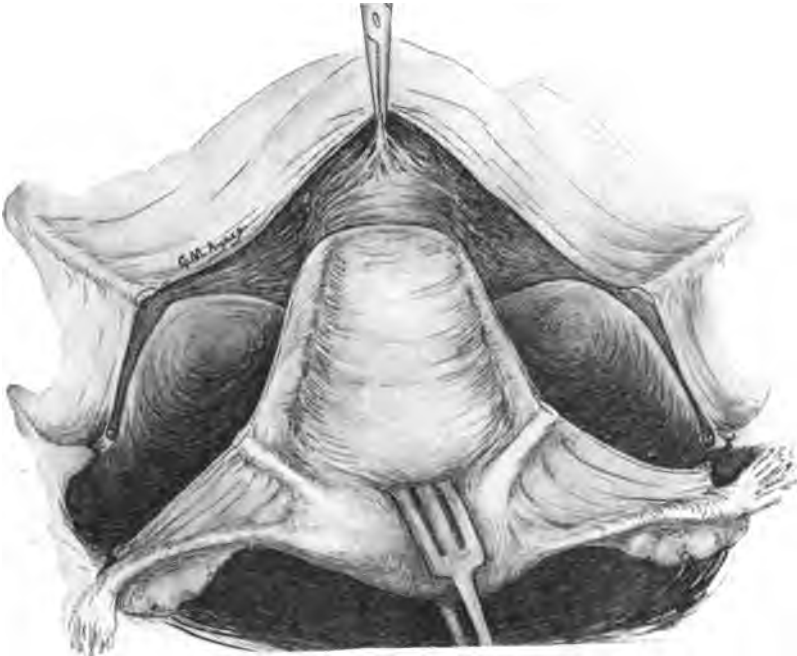


FIG. 6.—Uterus pulled backward and peritoneum with bladder dissected down over the vagina.

and gauze wiping on the sides as well as in front. Here occasionally a little artery will need to be caught and tied.

7. The vagina having been well exposed, and being directly under the eye, is caught with a hysterectomy clamp placed transversely just below its attachment to the cervix (Fig. 6), and with scissors the vagina is opened by a transverse incision above this clamp. Air enters the vagina and it at once balloons. Another hysterectomy clamp then catches the anterior wall of the vagina at right angles to the cut which has been made, and the clamp previously applied is removed (Fig. 7). Gauze is then pushed into the opening so as to

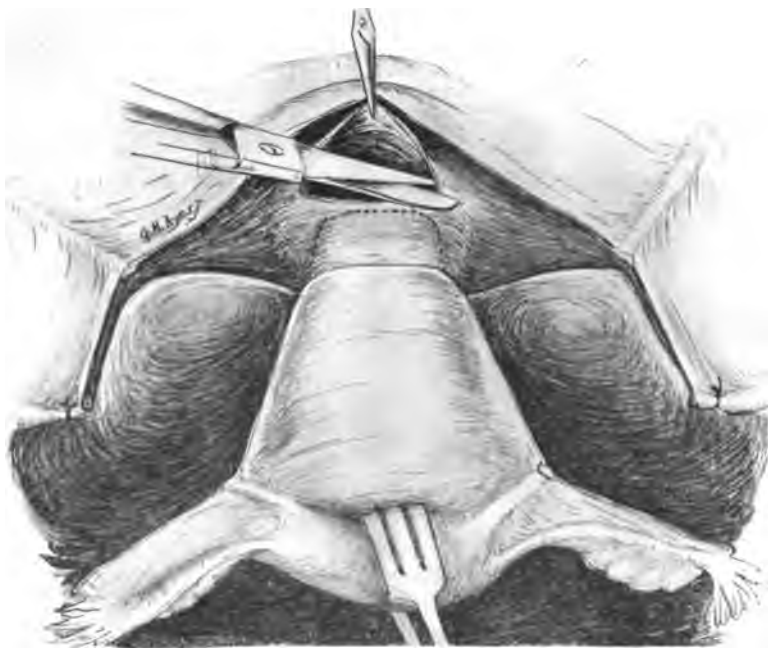


FIG. 7.—Opening vagina in front.

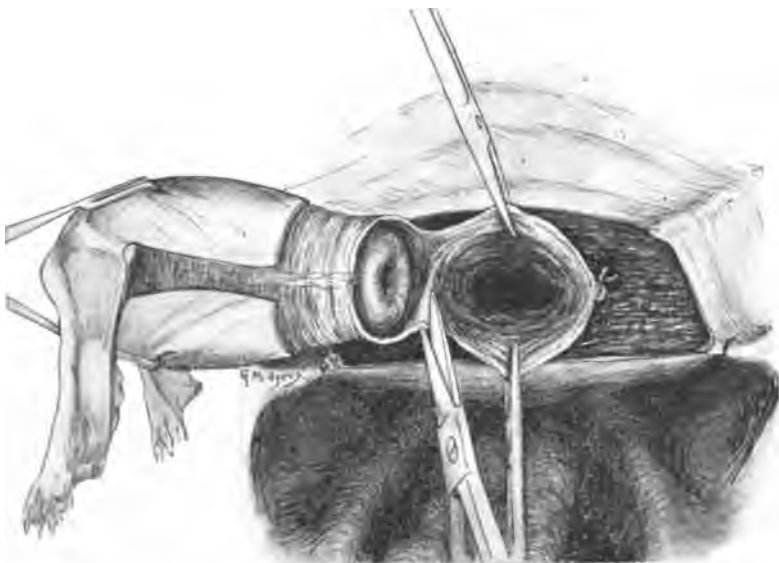


FIG. 8.—Final detachment of uterus from vagina.



absorb any iodine which may have been expressed from the uterus during the manipulations.

8. The finger is introduced through the opening into the vagina, or a strong hook, and by means of traction and scissors the vagina is separated on the side next the operator to a point in the posterior wall directly opposite the clamp which has caught the anterior wall. The assistant applies a second clamp at this point, and then the incision is completed around the cervix and the uterus removed.

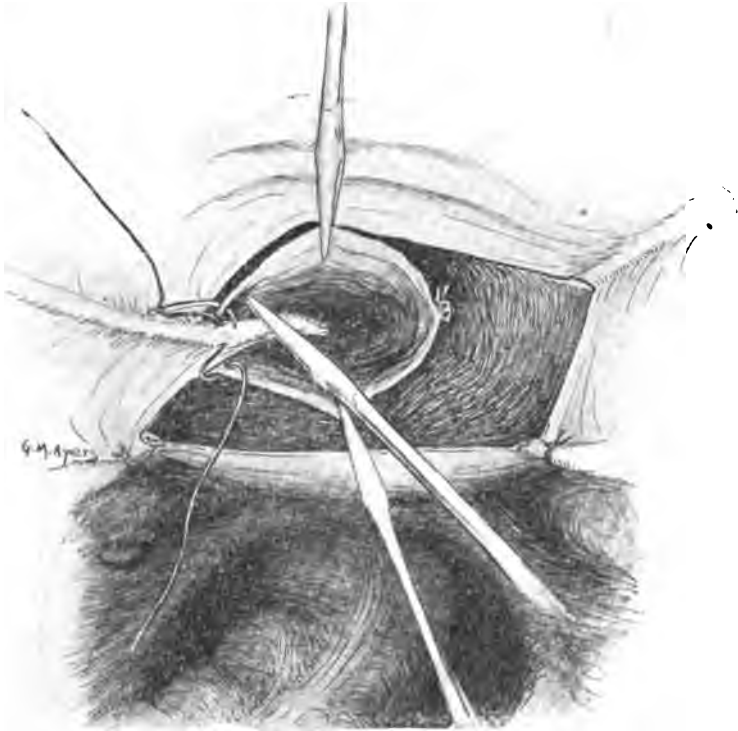


FIG. 9.—Implanting round ligaments into the vagina. Note knot on the inside.

This leaves the vagina gaping wide open, but held up firmly by the clamps applied to the front and back (Fig. 8). If there is any bleeding from the edge of the vagina the bleeding vessels can be readily caught and ligated.

9. A curved needle, threaded with chromicized catgut (I usually use No. 1 double), is passed from within the vagina out on one side, through the round ligament which has been caught at its end by an assistant and pulled directly inward, and returned from without in,

entering the vagina a quarter of an inch from its first point of passage. The end of the round ligament is pushed down into the vagina by the assistant, the ligature tied, and the hemostat removed (Fig. 9). The same procedure is executed on the opposite side. This leaves the vagina held up by the hysterectomy clamps front and back, and by the round ligaments on each side.

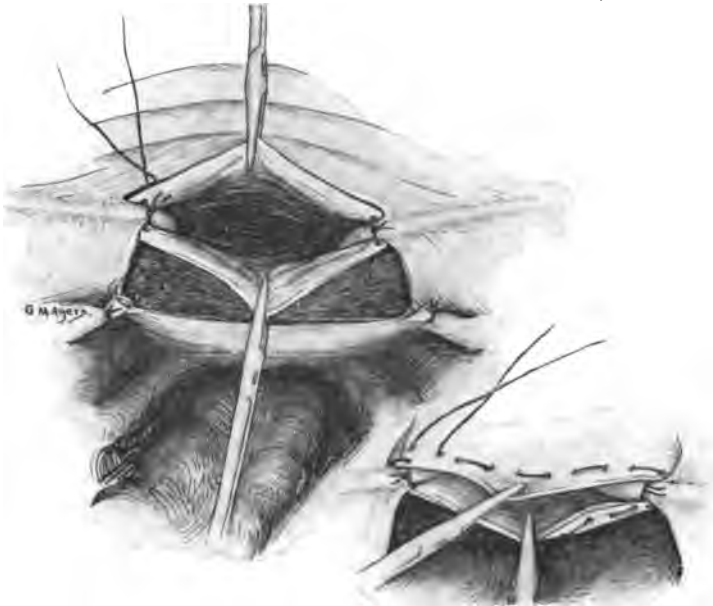


FIG. 10.—Both round ligaments implanted and pursestring inserted passing under each round ligament so as to bring in the broad ligament.

10. A chromicized catgut suture is passed in and out in the sub-mucous tissue around the end of the vagina, not penetrating the mucous membrane, and under each round ligament (Fig. 10). The assistant removes the clamps and this purse string suture is tied, the ends of the round ligaments and the edges of the vagina being



FIG. 11.

pushed in by the assistant by means of an inverter (Fig. 11). This thoroughly closes the end of the vagina, and brings the round ligaments, and in part the broad ligaments, into close apposition in the midline (Fig. 12).;

11. With iodine catgut the peritoneum in front and back is

brought together by continuous suture, commencing above the stump of the ovarian vessels on one side, continuing across and up to

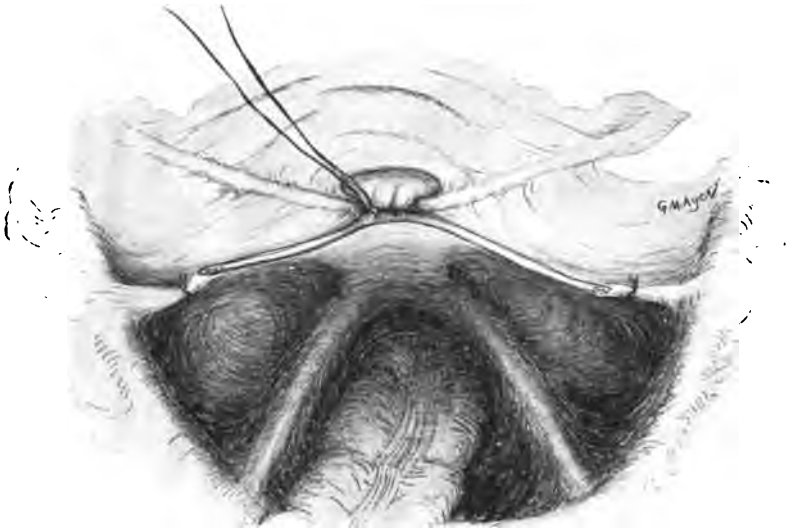


FIG. 12.—Purse string tightened bringing the parts into close apposition.

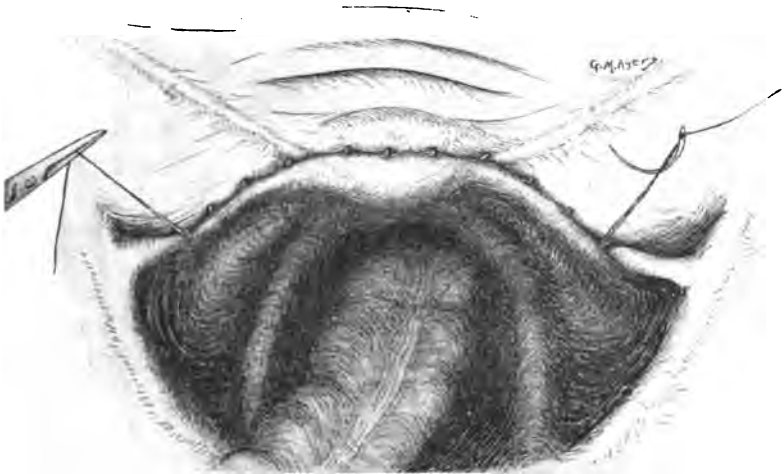


FIG. 13.—Anterior and posterior peritoneum brought together from side to side leaving absolutely no raw surface.

a corresponding point on the opposite side. By catching the peritoneum by a sort of Lembert suture the raw edges are all inverted and the floor of the pelvis is left perfectly smooth (Fig. 13). The

appendix is then removed, the parts examined for adhesions, kinks, gall-stones, etc., and the incision closed in the usual manner.

12. The gauze which was pushed into the vagina from above is now removed from below, the vagina wiped out, and a piece of iodoform gauze passed in and pressed up to the vault so as to absorb any oozing, and to furnish support to the vault in case of postoperative vomiting. This gauze is removed at the end of two or three days, and the parts then kept clean as usual.

The main advantages of this technic are:

1. Quite satisfactory sterilization is made by the iodine of the uterine cavity and of the walls of the vagina.
2. The parts from start to finish are held up so as to be thoroughly under the eye, and within easy reach for controlling hemorrhage.
3. The smooth closure of the pelvic floor leaves no point for adhesions, hence no postoperative ileus.
4. The work is done rapidly because of the complete exposure of the parts and their being within easy reach.
5. The support of the vault of the vagina is most satisfactory and complete.

In cases in which owing to extensive adhesions the peritoneum cannot be whipped over, the sigmoid should be mobilized and attached to the peritoneum in front so as to cover the raw surface. In cases in which pus is present, or oozing is feared, the round ligaments are implanted in the vagina as previously described, but the posterior wall is then split downward for a distance, and the true pelvis lightly packed with a washed piece of iodoform gauze of ample size, one end of which has been pushed down into the vagina so that it can be removed from below; over this gauze the sigmoid is mobilized as described above. The gauze is removed in about one week.

In cancer cases the ligation of the internal iliacs, exposure and protection of the ureters, and other necessary steps of the radical operation are carried out in the usual way, but when possible with implantation of the ligaments into the shortened vagina so as to prevent its prolapse.

The above technic I have used for several years, and have found it to be ideal, both in immediate execution and in end-results.

## INGUINAL HERNIA ATTACHED TO CORD, UNDESCENDED TESTICLE, UTERUS TUBES, AND BROAD LIGAMENTS.\*

BY

EDMUND D. CLARK, M. D., F. A. C. S.

Indianapolis, Ind.

THE following case is recorded, first, because it is a very good example of "pseudo-hermaphroditism" and, secondly, because it illustrates, what must be an exceedingly rare—contents in the hernial sac of a male.

The patient was thirty years of age. Family history negative, except that one younger brother has a double hernia with undescended testicles.

*Personal History.*—Patient had never had a serious illness. He had never had mumps. His mentality is above the average. He has succeeded in accumulating a comfortable fortune in the manufacturing business. His habits and activities are those of a normal man. There is an entire absence of any history of abdominal pain or crises suggestive of retained menses, and there has never been any bleeding from the penis. He has had normal sexual desire. He has been married for six years to an apparently normal woman, twenty-five years of age. She gives no history of pelvic inflammation. She has never been pregnant, although no precautions have ever been taken to prevent it. His weight is 175 pounds, height 5 feet 8½ inches. He is inclined to be fat. His beard is thin, but he has the features of a male. His shoulders, arms, breasts and trunk are those of the male type. An abundance of hair is present on his abdomen, and it has the normal distribution of a male.

Rectal examination revealed the presence of a prostate. There are no abnormalities of the penis. The scrotum is small and does not contain testicles or cord. The perineum is not dimpled. On examination the heart, lungs and abdomen are entirely normal. A large left inguinal hernia was found. The opening into the abdominal cavity was large enough to admit two fingers. The patient was operated upon January 19, 1915. Gas oxygen with novocaine was used as an anesthetic.

A transverse incision was made over the external inguinal ring. The sac was located and isolated by sharp dissection. It was opened and found to contain omentum, intestine and what appeared to be a band attached to the posterior wall of the neck of the sac. This was pulled upon and a mass was delivered upon the abdomen which proved to be a uterus, broad ligaments, tubes and a testicle. The uterus was about one-fourth the size of a normal uterus of an adult female. Between the peritoneal surfaces of the broad ligaments

\*Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

there was a plexus of large veins. The testicle was attached to the broad ligaments, but was not supplied with a vas deferens. The mobility of the mass was remarkable. It was found that the testicle had no other attachment except that to the broad ligament. To have separated the testicle from its attachment to the broad ligament would have entirely destroyed its blood supply. The entire mass was removed and the ring completely closed.

Section of undescended testis. Organ is normal in size and consistency, and microscopic section revealed a histological picture characteristic of a normal organ. The blood supply is normal, and the cells of the seminiferous tubules show mitotic figures.

Section of suspected uterus. The wall of this structure consists of a thick mass of unstriated muscle fiber and connective tissue. The outer portions of it embrace many large blood-vessels with thick walls and engorged with blood. Without this vascular layer, unstriated muscle and connective tissue is seen, the latter embracing bundles of the former, cut in all planes and showing a relatively large amount of muscular substance about the nucleus of the fibers. In the connective tissue are many small blood-vessels with well-developed muscular wall and a normal endothelial lining, the cells arranging themselves into plugs or nests rather than as true tubules, but in some instances showing an attempt at lumen formation, and some of the cells being distinctly columnar in type and showing inclusions of a substance apparently in the nature of a secretion.

A section from the large fan-shaped appendage on either side of the supposed uterus shows the wall consisting of connective tissue and large and small blood-vessels, while the inner portion shows as very much plicated lumen lined with ciliated columnal epithelium and having a highly cellular and richly vascularized submucosa. In some of the tubules a homogenous substance in the nature of a secretion is seen, and in one area the cells are of mucous-bearing type.

L. R. BRAITHWAITE, and W. CRAIG(1) report a case of

#### HERNIA OF THE UTERUS, VAGINA AND FALLOPIAN TUBES IN A BOY.

The patient was a boy fourteen years of age. The external conformation of this boy was perfectly normal. There was some growth of pubic hair; the penis was unusually large and perfectly formed. There was no alteration in the formation of the scrotum and the perineum was not dimpled. The right testis had not descended; on the left side there was a normal-sized testis, lying horizontally at the bottom of a hernial sac which reached to the lowest point of the scrotum. The sac contained what was thought to be omentum, which could be traced up to the internal ring as a thickened cord. The usual oblique incision was made in the left inguinal region and the hernial sac exposed. Slight traction resulted in the delivery of the whole sac on to the surface of the left thigh bringing with it the left testis. An incision was made into the sac and the testis, lying horizontally, was drawn upward; with it there appeared a perfectly formed Fallopian tube, having no apparent direct connection with the testis. Pulling the testis downward brought into view the whole of the

internal organs of generation of a female, with the exception that the positions usually occupied by the ovaries were filled with testis. The uterus was deep red in color and the normal size for a female of his age; it lay between two layers of peritoneum, was slightly bicornuate, and traces of round ligaments passed away from its two corners forward. The lower part of the uterus ended in a thickened cone at the cervix, and from this there passed off a wide band of fibrous tissue in the position of the vagina; this band of tissue ran up into the abdomen behind the bladder and became lost in the pelvic floor. The vaginal tract did not appear to be hollow at any part. Behind and below the uterus on either side lay a perfectly formed Fallopian tube; attached to each at its free end was a hydatid of Moegegin. There was a fine fibrous band passing from the uterus below the attachment of the Fallopian tubes to the region usually occupied by the ovaries. These bodies (proved to be testes) lay horizontally and were attached to the broad ligaments by mesentery. They were of the normal size for a boy of fourteen years, but devoid of epididymus or of vas deferens. In shape they were ovoid, the surfaces being shiny, smooth and clear white, except for a few areas of a light brown tint apparently due to fat. From the lower part of each testis a sheaf of large veins ran up into the abdomen. The mobility of the whole sheet of tissue containing the organs was remarkable and excision of the whole area would have been easy, but removal of the uterus and tubes alone would have been difficult. Reposition of the testis on the left side might have been the correct thing to do, but separation of the blood supply could not be insured. The question of treatment presented considerable difficulty but eventually it was decided to close the opening in the sac and return the whole to the abdomen; this was very easily done and the usual radical cure for hernia performed. The boy made an uneventful recovery. A portion of each testis was excised and sent for microscopical examination; the report states that both are testes with some excess of fibrous tissue.

A. PELLEGRINI(2) reports the discovery of a uterus with two tubes and two testicles in the hernial sac (right inguinal hernia) of a child having normal external male genitals. The patient was an otherwise well-developed child of twenty-six months. Instead of the ovaries, there were two testicles, the diagnosis of which could be confirmed histologically. The treatment consisted in the extirpation of the uterus and "adnexa" followed by radical operation of the hernia, according to Banin. The patient made a complete and uninterrupted recovery. The rarity of this observation, from the teratological point of view, is emphasized by the author, who states that Fantine in 1912, in commenting upon 4580 operations for hernia, briefly refers to a case of uterus and tube in a right inguinal scrotal hernia in a boy of eighteen years with a left ectopic testicle; this case will be published in detail later. Elsewhere in the literature the author was unable to find any cases similar to his own observation in which the perineal sac contained the uterus with both tubes and two well-developed testicles, the external male genital organs being

well developed. Although rare, however, the case is probably not unique.

At a meeting of the British Medical Association in London, 1895, the external organs of a child were shown who died after an operation for inguinal hernia. There was a normal bladder with prostate gland. Projecting backward were a vagina, uterus and broad ligaments, round ligaments and Fallopian tubes, with testes in the position of the ovaries.

#### UTERUS IN INGUINAL HERNIA IN MAN.

Brindeau's(3) patient was a virile man of thirty-five, apparently normal except for inguinal hernia. The sac contained a uterus of normal adult size, with both tubes, and on drawing them out both testicles came with them. The danger of injuring the testicles was too great to risk removing the uterus, so the small testicle was resected and the uterus was utilized to block the large inguinal canal, suturing it to the ring.

Brindeau found eighteen similar cases recorded in Neugebauer's book on hermaphroditism and gives a brief summary of each. A few of the men had families. In 25 per cent. of the cases the uterus was double. The testicles were rarely normal. In a few cases the uterus was continuous with a vagina which opened into the urethra. It is generally better to remove the uterus at the herniotomy. His compilation includes Webster's two cases.

*Endocrine Glands and Their Relation to Sex Aberrations.*—There is an abundance of evidence both experimental and clinical which tends to show that the proper development of the sex glands and the normal sex-ensemble are dependent on the normal activity of the endocrine system. The sex glands and the adrenal cortex are developed from the Wolffian ridge, whereas the medulla is of neuro-ectodermal origin, as are also the sympathetic ganglia. During intra-uterine life it is about equal in size to the kidney. This is due to an enlargement of the inner portion of the cortex, "the so-called fetal cortex," which begins to degenerate at or soon after birth. The medullary portion of the gland produces adrenalin; the cortical area is considered to be the source of a hormone that influences growth, nutrition and especially the reproductive organs (Barker).

Clinical and pathological evidence demonstrates the remarkable effects that lesions of the adrenal cortex exert on the various factors constituting sex (Quimby).

We have gained much knowledge of the whole subject by the articles of Hofstatter, Lounois, Pinard, Bulloch, Sequeira, Gallais, Glynn, and Apert.



The clinical manifestations of disturbed functions of the adrenal cortex vary according to the age at which the disturbance arises. Apert makes five groups: (1) cases in which the disturbance occurred in embryonic life, and is associated with a greater or less degree of hermaphroditism; (2) cases with normal sex organs but with too early and profuse development of bodily hair (hypertrichosis); (3) precocious puberty, overdevelopment of hair and fat, but without trace of hermaphroditism; (4) after puberty the menses disappear, the bodily fat increases, as does the hairs. Later cases showing loss of hair and overgrowth of fat at the time of the menopause. Glenn points out that tumors of the adrenal cortex in children are almost invariably accompanied by sex abnormalities. This is also true when occurring in adult women before the menopause, and in adult males they are never so accompanied.

The sexual changes seen in acromegaly and after experimental interference with the pituitary body (Crone, Cushing and Hormans) furnish evidence that this gland also exerts an action over some of the sexual characteristics. It may, therefore, be supposed that there exists some interrelation between the pituitary body and the adrenal cortex, though at present the evidence of such is largely speculative (Quimby).

The subject of hermaphroditism is one of great interest and a large literature has grown up in connection with it. There is, however, a great want of accuracy in the ideas of many of us on the subject. Hart(4) asks the question "What do we really mean when we speak of male and female sex?" The only criterion of sex is the nature of the sex glands. In the male we have the testis containing sperm cells which ultimately become spermatozoa; in the female, an ovary containing an ova. The presence of either ova or spermatozoa in a sex gland is characteristic and definitely settles the question. The secondary sexual characteristics are well-developed mammæ.

It is evident from the description of my case that we are dealing with a case of a typical male sex-ensemble. Inasmuch as the sex of an individual is determined by the nature of the gonad, regardless of the presence of abnormalities, either of other parts of the genital system, or of the secondary sexual characteristics of the body as a whole. Consequently this patient is of the male sex as the gonad attached to the broad ligament proved histologically to be a testicle. The patient, therefore, belongs to the class of male "pseudo-hermaphroditism" of the internal type.

The external genitalia show no deviation from the normal male type except that the scrotum did not contain testes. There is little

change in the secondary characteristics from the normal male. The voice, the hair on the face and abdominal and mental processes are all of the male type.

Negebauer (5) in going over 2000 case reports of pseudo-hermaphrodites found that those bearing the male gonad are about ten times as common as those bearing the female.

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### ABSENCE OF MUSCULAR TONE AN IMPORTANT ETIOLOGICAL FACTOR IN POSTOPERA- TIVE ILEUS.\*

BY

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FOLLOWING intraperitoneal operations a certain amount of stasis in the intestinal canal occurs. It has been our custom to regard it as only a temporary paralysis, in the majority of instances caused by insult to the peritoneum incident to manipulation. The usual conception is that the paralysis, with the consequent distention, is due to a reflected action upon the intestines through the nerve cells in the plexuses of Auerbach and Meissner.

This discussion does not apply to cases where there is sepsis present. We all know how difficult it is to exclude the possibility of a peritonitis in some instances, but there can be no doubt that, occasionally, a case is observed where its absence is proven and yet the patient dies from paralytic ileus in spite of all known remedies. The unfortunate part about such an experience is that it may occur when least expected; that is, when the supposed active factors in its production have been absent. By this is meant severity of operation,

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necessitating an unusual amount of intraperitoneal trauma with the resultant shock of prolonged anesthesia. The comparative frequency with which it has occurred, as a complication of vaginal hysterectomy, is significant because there is perhaps less trauma and shock incident to the handling of intestines than in any other operation where the peritoneal cavity is invaded. We will have occasion to refer to the apparent association later.

The degree of intestinal distention following the ordinary elective abdominal operation depends somewhat upon certain factors incident to the methods of procedure. Careful preparation of the patient for operation, proper choice and method of anesthesia, gentleness and judicious postoperative care, render further discussion of this subject unnecessary in the average patient. Occasionally, however, in spite of these precautions, we are confronted by an aggravated form of the above described condition when death ensues after the employment of every effort to relieve.

When the patient shows evidence of chronic fatigue with the poor tissue tone that follows chronic infection or long continued strain, there is always greater difficulty in dealing with this postoperative complication. It is the belief of the writer that in certain instances, where death occurs from so-called paralytic ileus, it is primarily due to lack of muscular strength in the walls of the stomach and intestine. This conclusion has been reached after careful observation of the various degrees of intestinal distention occurring in routine abdominal surgery. We find that the degree in the individual case depends largely upon the tissue tone of the individual previous to and the amount of exhaustion which occurs incident to the operative procedure. The amount of exhaustion or shock, as it is commonly called, also depends upon the extent of procedure and the character of anesthetic. In many instances it is an interesting index to the general tissue tone in an individual, but unfortunately its exhibition after operation has no value, except that it is a troublesome complication which causes no little alarm.

Keith<sup>(1)</sup> has recently called attention to the presence of nodal tissue in the bowel similar to that in which the heart beat takes its normal origin. This nodal tissue is in the shape of neuromuscular tissue and is interposed between the muscle fibers on the one hand and nerve fibers and nerve cells on the other. The relationship is so intimate that he finds it difficult to say often whether a certain intermediate branched cell is to be regarded as a muscle cell or as one of the cellular elements of the plexus. Keith regards the myenteric plexus as one of a composite texture composed of nerve cells, fine

fibers and branching intermediate cells which appear to become continuous with processes of certain groups of muscle cells on one hand and ganglionic cells of the nerve fibers of the plexus on the other. He concludes that nodal tissue is located at various points along the course of the intestinal tract which acts as the pace-maker for that particular section. This is of interest because it suggests the very intimate relationship that exists between the muscular and nervous system, and the disturbance that may arise if either is below the normal in efficiency; as in the heart, a block may occur at any point where one rhythmical zone passes into the succeeding zone.

Bayliss and Starling(2) demonstrated the intrinsic beat of bowel muscle. The musculature of the whole intestinal tract has its pulse. There is no reason why it does not vary in tone and strength as does the heart and every other muscle.

Magnus demonstrated in a study of isolated pieces of intestine that the strips beat more actively when removed from a normally-fed animal than when removed from an animal that was not digesting. Experiments lead to the conclusion that the entire intestinal canal is supplied with extrinsic nerves which regulate the control of tone. It has also been proven that if the canal is entirely separated from the central nervous system, it will develop an independent tonic state and after a time resume its rhythmic movements, but it will regain its characteristic movements only as it recovers tone. Tonus is, therefore, fundamental. Tonic contraction and rhythmic peristalsis disappear where there is general bodily weakness and where the depleted central nervous system fails to deliver the necessary tonic impulses(3).

For some time we have been observing the muscular tone of the intestinal canal both during and following abdominal operations. This study has been made in connection with one of tissue tone in general, with particular attention to heart muscle, and has led to the conclusion that postoperative distention will vary in direct proportion to the strength and tone of the muscular system. When careful study shows marked absence of tone before operation, and when inspection reveals a large dilated colon with marked absence of muscular tissue, we know that the patient will suffer more or less discomfort from this complication after operation, the degree depending upon the amount of strength remaining when the stress and shock of the operative procedure become effective.

In the study of a patient presenting the evidence of chronic fatigue with the above-mentioned handicap, some consideration should be given to the possibility of this complication for, in many instances,

while it may not prove serious, yet it undoubtedly adds much to the risk and is an additional worry to the surgeon in his postoperative care of the patient.

We have called attention in a previous paper to the significance that should be attached to careful study of the heart muscle in some cases of prolapse of the uterus. Careful observation will soon demonstrate to any operator that in this type of case abdominal distention is common and oftentimes quite troublesome. Study of our cases shows that it is not only failure of the cardiac muscle to withstand the stress, but in some instances there is exhaustion of the muscular structure of the stomach and intestines to such a degree that death ensues from what has been termed paralytic ileus. Reports in literature of death from this cause following simple procedures for the relief of uterine prolapse lead to the belief that it is due rather to absence of muscular strength than to some obscure effect upon the sympathetic nerve centers.

It is our custom to look with suspicion upon every case of prolapse of the uterus which develops rather suddenly: that is, when the principal predisposing factors have been present for a long time. This means oftentimes the addition of another factor, viz., sudden weakening of the muscular and ligamentous supports dependent upon some constitutional change in which the tissue weakness is a general one. Careful analysis of this predisposing cause may reveal widespread weakness of all tissues, and unless this condition is recognized, the resistance of the patient may be greatly overestimated.

While no instrument of precision, which will enable us to measure muscular tone, has been discovered, we believe that much may be learned from a correct study of the pulse pressure, where there is widespread muscular weakness. It is necessarily present in the cardiovascular system, and while we have been slow to grasp it, there can be no doubt that the careful study of blood pressure enables us to measure the strength of the heart muscle with much greater accuracy than ever before. Observation along this line leads us to believe that the great majority of cases under discussion show the same relative weakness in the muscles of the intestinal tract that is found in the heart and blood-vessels. In all patients, careful investigation of the blood pressure is made upon admission to the hospital. Operation is either refused or deferred in every patient where there is a pronounced fall in the pulse pressure after exercise. We have learned that this is the best index to vital resistance, and if operation is undertaken in a patient showing a marked fall in the pulse pressure, after a brisk walk or vigorous use of the dumb bells, the greatest care

is given to the selection of the anesthetic, extent and duration of the operation. A patient thus handicapped will stand but little stress and exhaustion soon follows a short drive under any form of anesthesia. Two years ago we met with an experience in a patient who showed plain evidence of the relative strength of the heart and intestinal musculature, had we been able to grasp it. The loss of the patient was a great shock, but it awakened a keener interest in this subject and has led to more careful observation and study of every patient where there is any evidence of such weakness. A brief report of the case may be of interest.

Mrs. L. B., aged forty-eight, admitted to St. Francis Hospital, November 6, 1914. Diagnosis: Laceration of the perineum, cystocele, chronic endocervicitis, and prolapse of the uterus. This patient, aside from an attack of typhoid fever at the age of twenty-five, gave a history of perfect health until three months before admission. At this time she first noticed the uterus coming out of the vagina and since that time has not been feeling well in a general way. She has complained of being tired and unable to withstand fatigue. She has had some shortness of breath on exertion. Patient appears in perfect health, well nourished and color unusually good. Physical examination reveals slight irregularity of the pulse. For this reason, she was placed in bed and kept there for a number of days, at the end of which time the pulse seemed perfectly regular, and while the heart sounds seemed somewhat distant they were perfectly clear. On November 14, her condition seemed very good, and it was decided that there would be no unusual risk in operating. The operation consisted of the repair of the cervix, cystocele and rectocele, shortening of the round ligaments, a procedure unaccompanied, as a rule, by any great amount of shock. It was noted at the time of operation that the tissues were unusually soft and friable. Ether anesthesia. Patient was unable to void after operation, and there began on the following day persistent distention of the intestines, which was accompanied by vomiting. Gastric lavage afforded relief for a few hours, as did the use of pituitrin and the repetition of enemas. This condition persisted for three days when, owing to a possible doubt as to the presence of some mechanical obstruction due to the operation, the abdomen was again opened. No mechanical obstruction was found, nor was there any evidence of peritonitis. The intestines were distended throughout, and while an enterostomy was done 4 inches from the ileocecal valve, the distention continued without relief. The patient died two days later from paralysis of the entire intestinal tract.

There seemed no doubt in this patient that death was due to lack of horsepower, and that it was located not only in the cardiovascular system, but in the unstriated muscular fibers of the gastrointestinal tract. A case of this kind supports the arguments advanced, that the prolapse was an important index and was a danger signal, which, if properly appreciated, might have prevented a surgical death.

A keen appreciation of this phase of the subject, taken in connection with the general summary of the findings in a given patient, will lead to careful preparation of the patient for operation, and will influence in many ways the method of procedure at the time of operation. Fewer patients of this type will be operated upon without a long period of rest in bed preparatory to any severe operative procedure. Much greater care will be exercised in the type of anesthetic. Local or spinal anesthesia will be employed more frequently because by these methods energy will be conserved. The strength of the patient will serve as a gauge for the extent of the procedure. Multiple operations will be avoided unless absolutely necessary. In many instances, unless the tone of the individual can be raised to a point where the resistance is equal to the strain, operation will be withheld and the serious risk of a fatality avoided. Prolonged inhalation anesthesia will be given with respect for the kind and method of administration. If ether, it will be finally learned that much better results will be obtained by giving ether vapor or by the closed method. Many of the advantages of nitrous oxide are due to rebreathing rather than to the virtue of the nitrous oxide itself. We find that by subjecting this type of case to prolonged rest, open air with general massage and good food, that operation is followed by almost no postoperative distention. It is our belief that when a patient is given ether he is subjected to the same test, and that the effect is similar to that of a Marathon race. At the end there is exhaustion, and in certain patients the reserve strength is not sufficient to withstand the test.

The writer has had two fatal results from paralytic ileus. A study of these cases and observations upon patients where there has been severe distention following abdominal operations, has led to the belief that the condition is due in some cases to the direct effect of exhaustion over weakened muscular tissue rather than to some reflected action through the sympathetic nervous system.

We are fully aware that there is nothing new in this conclusion, and that the individual resistance of patients is fully appreciated by surgeons at the present time. We desire to emphasize the point that the mortality rate in elective surgery in the practice of a given surgeon represents his ability to appreciate these principles. While experience may bring a perfected judgment which grasps these various danger signals almost intuitively, we must admit that occasionally a patient springs a painful surprise after operation due to some condition that should have been recognized long before.

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- WESTINGHOUSE BUILDING.

## DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City.—I wrote a paper last year, but it did not have the dignified title Dr. Huggins has given to his. I called mine "Gas Pains" because that is the term which the interne and the young man commonly use, and I wanted my paper to go to them.

All those who have written on the scientific aspect of the subject and have reached into the cause of it and explained it have not given as good an opinion or explained it so well as Patterson, who advances the carbonic acid theory, or, better, the hypothesis that when you open the abdomen the carbonic acid is exhaled from the intestinal surface. Even if you put on moist gauze pads, it is exhaled in quantity and as the carbonic acid is a hormone unstriated muscle fiber you produce paresis of that part of the gut exposed; consequently those who do not eviscerate and are instrumental surgeons, and those who avoid exposure of the intestines and manipulation, adding as little traumatism to evaporation as possible, are the ones who have less gas pains.

Working on that idea I carried it out after writing my paper, and as a result my internes are seldom called out at night to the bedside of patients to relieve gas pains. So I think the carbonic acid thought is a good one.

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CHRONIC INTESTINAL STASIS—SOME CASE REPORTS.\*  
SERIES I.

BY

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New York City.

(With seven illustrations.)

RIGHTLY the profession of medicine is slow to accept any new theory concerning disease or method of treatment. Scientific skepticism is justly regarded as a safeguard to the receipt of knowledge. Initial velocity is not sufficient to establish an hypothesis as fact.

Chronic intestinal stasis, or what the writer has often termed defective human plumbing, is increasingly being accepted as one of the fundamental causes of disease. Gradually the profession is coming to consider the condition as an entity, with far-reaching results. Many of those to whom stasis and constipation were at one time synonymous are broadening their viewpoint and learning that there may be residual intestinal content doing damage to the entire

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organism, regardless of whether there be activity of the lower bowel or not. This is evidenced by the fact that some of the worst cases of stasis occur in those with diarrhea.

Unfortunately, in the minds of many of the profession (happily their number seems rapidly diminishing), intestinal stasis has been thought to indicate only one kind of treatment—the removal of a large portion of the intestine with its consequent extreme surgical risk.

Those who have given thoughtful attention to the teachings of Lane and others are recognizing the truth of the oft-repeated statement that the vast majority of all cases of chronic intestinal stasis belong to the physician, through whose prompt and proper care the necessity of seeking ultimate relief at the hands of the surgeon will be obviated. Between this overwhelmingly large group and the relatively small number of neglected patients (those late in the disease, or previously treated by improper or inadequate surgery) who must have part of their plumbing removed in order to attain comparative health and not drift into chronic invalidism with attendant complications which may terminate life, there remains a mid-group. In these cases a careful application of conservative surgery to the abdomen, according to the principles of the mechanics of the intestinal canal, returns the patient to the first group where, with medical care and reasonable attention to hygiene and dietetics, he can be restored to health and strength.

The writer, who has been for many years a close student of body plumbing, has published from time to time articles covering various phases of the subject of chronic intestinal stasis. The accompanying photographs have been previously utilized in this connection. It is his purpose in this and a number of subsequent papers to report succinctly a series of case histories illustrative of various types of stasis treated surgically and, though brief, these will comprise the essentials in such manner as to present a sufficient groundwork upon which to base conclusions. "Evidence is and must be the test of truth;" as it is only by weighing the evidence in relation to methods of treatment that medical progress is possible, it is hoped that the following case reports which give actual results—good, bad and indifferent—may serve to facilitate this end.

#### CHRONIC INTESTINAL STASIS; OVARIAN CYST; UTERINE DISPLACEMENT.

CASE I.—E. J.; female aet. fifty-one; single.

*Previous History.*—For fifteen years patient had been suffering from marked constipation; abdominal discomfort; extreme exhaustion; headache. Had undergone previous operation for removal of

fibroid tumor and hemorrhoids, with no relief of the above symptoms. When the patient was first seen by me in the summer of 1902 she was practically an invalid.

*Clinical Diagnosis.*—Chronic intestinal stasis; ovarian cyst; uterine displacement.

*Operation*, October, 1902, at Alston's Private Hospital, New York City. *Findings*: Uterus bound tightly to the rectum; small ovarian cyst present; also a mass of adhesions causing colonic and ileal stasis.

*Treatment.*—Uterus sutured forward; cyst removed; numerous adhesions relieved. Raw surfaces covered; stasis apparently corrected. Uneventful recovery.

*Status Præsens.*—Examination August, 1916; slight constipation at times; no abdominal discomfort; no headache. Seemingly perfectly well. Patient states she has been teaching regularly since Jan., 1903.

#### CHRONIC INTESTINAL STASIS; UTERINE DISPLACEMENT.

CASE II.—L. T., female, aet. forty-two, single.

*Previous History.*—Had been suffering from epigastric and abdominal pain; marked constipation; large amount of gas; headache; dysmenorrhea. Was under medical treatment during the summer of 1901, and again during the summer of 1902; at this time a nurse was in attendance for seven weeks; loss of over 30 pounds in two and one-half years. General condition of the patient was so extreme when seen by me early in the fall of 1902 that rectal feeding had to be resorted to in order to strengthen the patient sufficiently to withstand surgical treatment.

*Clinical Diagnosis.*—Chronic intestinal stasis; uterine displacement.

*Operation*, October, 1902, at Alston's Private Hospital, New York City. *Findings*: Uterus retroverted; numerous adhesions; the enlarged, chronically inflamed appendix was twisted upon itself in two places, and in the center of a mass of old inflammatory tissue causing colonic and ileal stasis; ovaries normal, except for congestion.

*Treatment.*—Adhesions separated; appendix removed; cecum plicated and an ileopelvic band corrected; all inflammatory tissue was removed and raw surfaces covered; uterus anchored in its proper position. Uneventful recovery.

*Status Præsens.*—Examination August, 1916. Other than occasional constipation, the patient is in excellent condition; weighs 150 pounds; looks the picture of perfect health. Patient states she has been teaching regularly since Jan., 1903.

#### CHRONIC INTESTINAL STASIS; OVARIAN CYST.

CASE III.—M. H., female, aet. forty-three, single.

*Previous History.*—Never strong; for eight years previously had been suffering from marked constipation; abdominal discomfort;

emaciation; headache; considerable dysmenorrhea. Skin icteric, almost alarmingly so. Had been treated for profound anemia. No previous operation.

*Clinical Diagnosis.*—Chronic intestinal stasis; ovarian cyst.

*Operation*, October 12, 1903, at Alston's Private Hospital, New York City. *Findings:* There was an ovarian cyst the size of a six months' pregnancy which had grown to the bowel; marked colonic stasis; many adhesions.

*Treatment.*—The uterus, ovaries and appendix were removed; adhesions relieved; stasis apparently corrected.

*Status Præsens.*—Examined August, 1916. Constipation at times which is readily relieved by bran; otherwise patient has had no symptoms since the operation. Has been teaching continuously for the past twelve years.

CHRONIC INTESTINAL STASIS; CARCINOMA OF THE TRANSVERSE COLON  
AND GREAT OMENTUM; ENLARGED GLANDS IN THE MESOCOLON;  
COLECTOMY; SHORT-CIRCUIT.

CASE IV.—W. J., male, aet. forty-seven, married, policeman. Referred to me by Dr. Wm. VanValzah Hayes, New York, and Dr. W. B. Thompson, Brooklyn.

*Previous History.*—Had been suffering for years from chronic constipation. On December 25, 1908, immediately after eating a hearty dinner, patient was seized with severe abdominal pain. Medical treatment for several weeks with no relief; then referred to me. No previous laparotomies.

*Clinical Diagnosis.*—Chronic intestinal stasis; tumor mass in the region of the transverse colon, probably carcinoma; obstruction.

*Operation*, January 22, 1909, at the New York Polyclinic Hospital. *Findings:* Advanced cancer of the transverse colon involving the great omentum, with almost complete obstruction; glands in the transverse mesocolon much enlarged, some extending up along the large vessels behind the stomach to the diaphragm; along the ascending and transverse colon, including the hepatic flexure, there were many bands of obstruction, the malignancy having apparently developed at the place where the stasis was most marked; there was a typical Lane's kink of the ileum, so that the gut was larger proximally than it was distally to that point; at one point in the greater curvature of the stomach there was evidence of malignant thickening of the peritoneal coat.

*Treatment.*—The thickened area of the greater curvature of the stomach, most of the ascending colon and all of the transverse colon, together with the gastrocolic omentum, were removed; the entire mesocolon of the portion of gut removed was excised close to the posterior abdominal wall; anastomosis was made between the cecum and the pelvic colon below the last kink. Uneventful recovery; patient returned to work three months after operation.

*Pathological Findings.*—Adenocarcinoma of the transverse colon, and glands.

*Status Prasens.*—July 12, 1916, patient reports by letter of this date that he has no symptoms whatever; is seemingly perfectly well, and has been working continuously since April, 1909.

#### CHRONIC INTESTINAL STASIS; SHORT-CIRCUIT.

CASE V.—S. C., male, aet. thirty-three, tailor.

*Previous History.*—Had been suffering from abdominal discomfort; headache; nausea; loss of strength; nervousness; depression; stained skin; constipation so marked as to be almost obstipation; often the most active cathartics would not move the bowels.

*Clinical Diagnosis.*—Chronic intestinal stasis.

*Operation.* May 5, 1911, at the New York Polyclinic Hospital. *Findings:* Numerous adhesions all about the ascending and descending colon; the sigmoid was folded upon itself forming almost a volvulus; the hepatic and splenic flexures encased in bands. Marked Lane's kink.

*Treatment.*—Appendix removed; ileopelvic band corrected as far as possible, cutting transversely and sewing up longitudinally. Other bands corrected. Uneventful recovery.

*Subsequent History.*—Improvement in constipation immediately following operation with some relief of symptoms; after several months return of symptoms as previously; skin discolored; abdominal discomfort; headache; nervousness; depression; extreme constipation. At times patient was compelled to take eight compound cathartic pills in twenty-four hours, in addition to oil enemas, to obtain any movement of the bowels.

*Second Operation.* January 23, 1912, at New York Polyclinic Hospital. *Findings:* Numerous adhesions with dropping of colon; there was a sigmoid loop forming a diverticulum attached to the mesial aspect of the descending and transverse colons.

*Treatment.*—Typical Lane short-circuit operation. Uneventful recovery. Improvement of all symptoms; slight looseness of bowels which, with moderate care, became normal in a few weeks. Remarkable change in color of skin and in mental attitude.

*Status Prasens.*—July 11, 1916, patient reports by letter of this date that he has been eating three good meals a day; bowels are moving well without cathartics; that he has been at work regularly since three months after the second operation; and that he is "thoroughly restored to health and strength."

*Remarks.*—It is important to note here that the attempt to place this patient in the midgroup cases—that is, with those cases requiring conservative surgery—proved futile. Had the case been classified with the end group, where it properly belonged, and the radical operation performed in the first instance, the patient would have avoided one operation and much needless suffering. It illustrates an error in being too conservative.

## CHRONIC INTESTINAL STASIS; ADHESION OF GREAT OMENTUM TO CECUM; UTERINE DISPLACEMENT.

CASE VI.\*—T. M., female, aet. fifty, married, one child. Referred to me by Dr. A. LaMonte, Carmel, New York.

*Previous History.*—For many years had been suffering from pains in the back and lower extremities; constipation; abdominal discomfort; frequent attacks of so-called acute indigestion; vertigo; nervousness; darkly colored skin; considerable loss of flesh and strength. Medical treatment from time to time with very little improvement. No previous laparotomies.

*Clinical Diagnosis.*—Chronic intestinal stasis; uterine displacement.

*Operation,* June 11, 1912, at Alston's Private Hospital, New York City. *Findings:* Uterus retroverted; chronically inflamed appendix with marked perityphlitis; appendix firmly adherent to the cecum



FIG. 1.—Case VI. Inflammatory stasis. T. M.; Band of omentum, two inches wide, firmly adherent to meso-appendix, drawing stomach downward and to right; appendix, throughout its entire length, firmly adherent to cecum.

throughout its entire length; many bands about the cecum and terminal ileum; bands of great omentum firmly adherent to the meso-appendix drawing the stomach downward and to the right; marked ileal stasis; dilation of duodenum and stomach.

*Treatment.*—Ventral fixation of uterus; removal of appendix; constricting bands severed transversely and sewed up longitudinally. Uneventful recovery. On leaving the hospital a Lane-Curtis belt was prescribed, with instructions to adjust it while lying down, with the organs pushed toward the diaphragm. The use of Russian oil was urged.

*Subsequent History.*—May 12, 1915, patient returned complaining of some pain in the neighborhood of the gall-bladder. Examination revealed a slight clogging of the hepatic flexure. Patient had discontinued the use of Russian oil some time previously; this was

\* Case not previously reported. Illustration appeared in "A Contribution to the Study of Chronic Intestinal Stasis," *Medical Record*, September 27, 1913.

again ordered. Otherwise, conditions good; there had been a gain in weight of 13 pounds.

*Status Præsens.*—July 15, 1916, patient reports by letter of this date that she is able to do all her housework and is feeling perfectly well, except for slight occasional "rheumatic pains" in the ankles; since operation there has been a gain in weight of fifteen pounds.

*Remarks.*—It is important to note in this instance that, in contrast to Case V, conservative surgery has thus far proved of great benefit to this patient. The midgroup classification for this case has apparently been correct. To me the greatest difficulty in connection with cases of chronic intestinal stasis is their proper classification so that a second operation may be avoided. Especially in this field, which remains largely to be worked out, are we confronted with the ever-present dilemma of being too radical on the one hand and too conservative on the other.

CHRONIC INTESTINAL STASIS; PERFORATED ULCER OF THE DUODENUM JUST BEYOND THE PYLORUS, WITH INFLAMMATORY DIVERTICULUM; MARKED LANE'S KINK.

CASE VII.\*—C. C., male, aet. forty-seven, widower. Referred to me by Dr. Wm. VanValzah Hayes.

*Previous History.*—For three years had been suffering from attacks of nausea and vomiting which were becoming increasingly frequent; occasional headache; constipation; large amount of gas; pain in epigastrium, also across upper abdomen (above umbilicus) and back, more particularly four or five hours after eating; loss of considerable weight and strength.

*Clinical Diagnosis.*—Chronic intestinal stasis; ulcer of the duodenum; Lane's kink.

*Operation.* January 25, 1913, at New York Polyclinic Hospital. *Findings:* A small indurated mass in the duodenum just beyond the pylorus; the duodenum was kinked by a firm adhesion to the neck of the gall-bladder, which was free from stones or evidence of cholecystitis; behind the pylorus were large glands and indurated tissue running up behind the liver; there was a small fibroid on the anterior surface of the right lobe of the liver; a Lane's kink was found tightly fastening the ileum to the pelvic wall at a point about four inches from the cecum.

*Treatment.*—Posterior gastroenterostomy, 2½ inch opening; edges of the separated mesentery were approximated and stitched into place along the gastroenterostomy opening; a normal appendix was removed in order to give more ready access to the Lane's band which was severed and the edges of the peritoneum drawn together; the small fibroid of the liver was excised and the liver sutured. Uneventful recovery.

*Status Præsens.*—July 15, 1916; patient reports by letter of this date that he is very well; does a full day's work and barely knows

\* Case partially reported with illustrations in "Chronic Intestinal Stasis Surgically Considered," *New York Medical Journal*, January 24, 1914.

he has a stomach; there has been a marked gain in weight and strength; he continues to take a small dose of Russian oil each night.

*Remarks.*—Figs. 2, 3, and 4, illustrating this case, indicate how futile a gastroenterostomy would have been, without proper attention to the other conditions present.

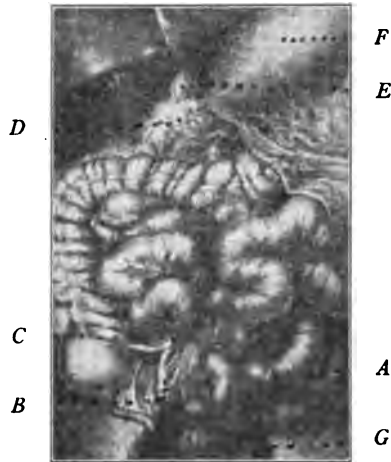


FIG. 2.—Case VII. C. C.; Patient practically in vertical position. *A*, Dilated ileum; *B*, terminal coil of ileum; *C*, Lane's kink; *D*, inflammatory mass around first portion of duodenum; *E*, diverticulum of duodenum; *F*, dilated stomach; *G*, pelvic colon.



FIG. 3.—Case VII. C. C.; Upper part of Fig. 2, enlarged, showing more detail.

CHRONIC INTESTINAL STASIS; UTERINE DISPLACEMENT; PELVIC ADHESIONS.

CASE VIII.—J. D., female, aet. thirty-one, married. Referred to by Dr. W. H. Cantle, Mamaroneck, New York.

*Previous History.*—Three miscarriages. For three years patient had been suffering from headache; abdominal discomfort; large amount of gas; marked constipation; severe depression; loss of weight and strength; dysmenorrhea; local signs and symptoms of uterine displacement and pelvic congestion. Previous laparotomy in November, 1911, curettage, and uterus suspended. Symptoms increasingly severe after operation. When patient was first seen by me in June, 1912, her general condition was exceedingly poor.

*Clinical Diagnosis.*—Chronic intestinal stasis; uterine displacement; pelvic adhesions.

*Operation,* June 12, 1912, at The Bethesda Hospital, White Plains, New York. *Findings:* Uterus retroverted; chronically inflamed appendix; enormous mass of adhesions, evidently the result of an infection, throughout pelvic cavity and posterior to uterus and pelvic colon; bands about cecum and terminal ileum causing marked ileal stasis.



FIG. 4.—Case VII. C. C.; Lower part of Fig. 2, enlarged, showing more detail.

*Treatment.*—Curettage; uterus sutured forward, modified Gilliam; appendectomy; bands about cecum and terminal ileum corrected. Condition of patient so extreme as to preclude further surgical interference. Uneventful recovery.

*Subsequent History.*—October 14, 1912, patient returned complaining of severe pain through left side over pelvic colon; general condition improved though not well; still some constipation; headache; no material gain in weight.

*Second Operation,* November 23, 1912, at Alston's Private Hospital, New York City. *Findings:* Multiple postinflammatory adhesions; pelvic colon twisted and firmly adherent to left broad ligament posteriorly and to the parietal peritoneum; for several feet, beginning  $1\frac{1}{2}$  feet from ileocecal valve, numerous areas of ileum adherent to parietal peritoneum; uterus, normal position.

*Treatment.*—Pelvic colon freed; all adhesions severed; raw surfaces covered; omentum sutured with plain catgut deeply down in



pelvis so as to cover raw surface of left broad ligament. Uninterrupted recovery.

*Subsequent History.*—April 4, 1913, patient returned still complaining of some pain in left side; periodical attacks of weakness accompanied by hyperidrosis; occasional headaches; general condition much improved; gain in weight and strength.

*Third Operation,* April 12, 1913, at Alston's Private Hospital, New York City. *Findings:* Numerous adhesions, though less in density and number than previously, situated along descending and upper part of pelvic colon.

*Treatment.*—Adhesions severed; raw surfaces covered. Oxygen administered intraabdominally; abdomen sutured full of oxygen gas. Uninterrupted recovery.

*Status Præsens.*—Examined April 25, 1916; gain of thirty-five pounds during past three years; no pain; no constipation; able to do all her own housework; seemingly in perfect health.

*Remarks.*—It is interesting to note in connection with this case that, in spite of the enormous quantity of adhesions and bands with their resultant symptoms of pain and stasis, only conservative surgery was at all times indicated. Of course, had the patient's condition been such as to warrant a more thorough surgical procedure in the first instance, one operation might have been avoided. However, in view of the subsequent history with the persistent symptom of pain in the left side necessitating a third operation, even this is doubtful. The administration of oxygen, intraabdominally, was a further effort to avoid re-formation of adhesions.

#### CHRONIC INTESTINAL STASIS; EXTENSIVE ILEOPELVIC BANDS.

CASE IX.\*—C. C., female, æt. twenty-two. Referred to me by Dr. J. Douglas Nisbet, New York City.

*Previous History.*—For five years, since operation for nonunion of a broken collar-bone, had been suffering with so-called post-operative neurasthenia; frequent vomiting; vertigo; pain in back of neck; great depression at times; insomnia; constant nausea; loss of fifteen pounds in weight. Bowels regular. Prolonged medical treatment without satisfactory improvement. No previous laparotomies.

*Clinical Diagnosis.*—Chronic intestinal stasis.

*Operation,* March 12, 1913, at New York Polyclinic Hospital. *Findings:* Marked gastropnoia; liver and right kidney also displaced downward; evolutionary bands extending directly over pylorus to transverse colon; duodenum markedly dilated with a constricting band angulating its caliber just below the papilla of Vater and extending transversely across the duodenum down to the transverse colon; the mobile cecum, acting as a bucket to retain fecal matter, pulled on the posterior wall of the abdomen, drawing over entire peritoneum, and extended into the true pelvis; bands in right iliac

\* Case not previously reported. Illustration appeared in "The Significance of Intraabdominal 'Bands,' 'Folds' and 'Veils,'" *Boston Medical and Surgical Journal*, February 19, 1914.

fossa partially holding the twisted cecum out of the pelvis; the ileum was connected to the anterior surface of the psoas muscle by a strong Lane's band across which lay the appendix, with a large gland nearby; there was also a strong, broad evolutionary band which extended from the ascending colon to the mesentery of the ileum, just above the Lane's band, about six inches from the cecum, angulating the ileum and ascending colon; sigmoid flexure of the colon, pelvic organs and gall-bladder explored and found normal.

*Treatment.*—All bands were corrected by bisecting transversely and suturing longitudinally, thus relieving angulations; appendix and nearby gland were removed; head of the colon was anchored

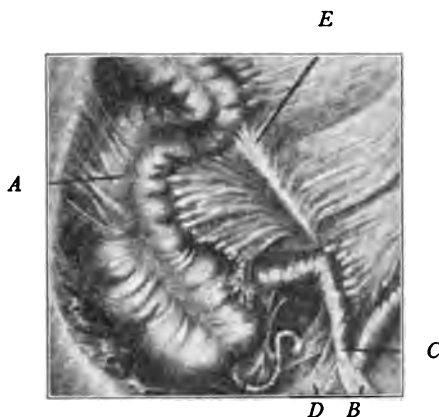


FIG. 5.—Case IX. C. C.; A, "Jackson's membrane;" B, multiple Lane's bands; C, Lane's kink; D, appendix caught in bands; E, thickened part of mesentery forming a strong band.

to the posterolateral wall of the abdomen by sutures through the lateral muscle band. Uneventful recovery.

*Status Præsens.*—July 20, 1916, patient reports by letter of this date that she seems perfectly well; no abdominal soreness; eats and sleeps well; is in good spirits; gained of 10 pounds in weight; requires a little cascara, weekly, to keep bowels in good condition.

#### CHRONIC INTESTINAL STASIS.

CASE X.\*—L. E., male, aet. thirty-eight., married, physician.

*Previous History.*—For eight years, since a fall from a horse, had been suffering with severe pains in stomach and abdominal discomfort, more particularly after eating; large amount of gas in stomach and bowels; chronic constipation; depression. Considerable medical

\* Case partially reported with illustrations in "Eleven Cases—Röntgenographic and Operative Findings," *American Journal of Röntgenology*, September, 1914.

treatment from time to time with only little relief. No previous laparotomies.

*Clinical Diagnosis.*—Chronic intestinal stasis.

*Operation,* March 24, 1914, at New York Polyclinic Hospital.

*Findings:* Healed ulcer of duodenum three-quarters of an inch beyond pyloric orifice; below this a number of bands extended from

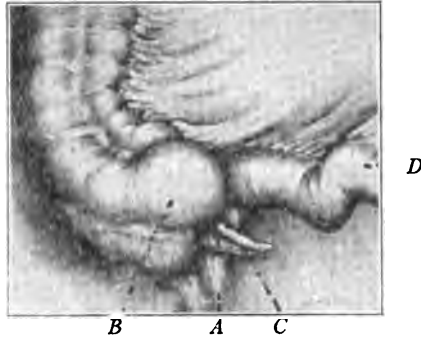


FIG. 6.—Case X. L. E.; A, Very strong ileopelvic (Lane's) band; B, mobile cecum; C, mesoappendix attached to Lane's band; D, dilated terminal ileum, with patulous ileocecal valve.

behind across duodenum, indenting it toward transverse colon and greater curvature of stomach; transverse colon much collapsed with hepatic flexure hanging downward almost to umbilicus, splenic flexure well supported; mobile cecum; posterior muscle band was anterior and below, forming an angle around a fixed point at the base of the appendix; the mid-point of the appendix, which was five

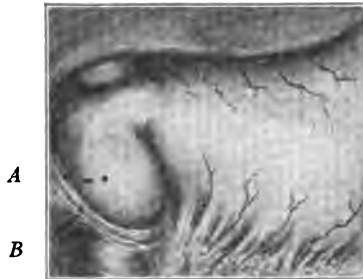


FIG. 7.—Case X. L. E.; A, Dilated duodenum; B, band of constriction across duodenum.

inches long, represented a band extending into pelvis, around which mobile cecum rotated; patulous ileocecal valve; dilated terminal ileum; several adventitious bands about sigmoid; ileopelvic Lane's band with mesoappendix attached to it.

*Treatment.*—Appendix was removed and band from mesoappendix cut transversely and the raw surface turned in, fine linen thread

dipped in paraffin being used for sutures; duodenal and other bands similarly corrected; the caput coli was sutured into normal position in the right flank, preventing rotation and descent into the pelvis; a stitch was taken directly at the junction of the caput coli and the ileum, slightly indenting the site of the valve; the adventitious bands of adhesions on the sigmoid colon were bisected one way and sutured the other, leaving a normal last kink in the sigmoid.

*Subsequent History.*—Immediately after the operation patient had a violent attack of vomiting, rupturing a few stitches in the wound which healed well later, but resulted in a hernia. Otherwise, recovery was uneventful.

*Second Operation.* June 5, 1916, at Alston's Private Hospital, New York City. Hernia corrected.

*Status Præsens.*—July 1, 1916, patient reports by letter of this date that he is feeling perfectly well; no aches or pains of any kind; eats everything; sleeps well; in good spirits; gain of 22 pounds in weight since operation; bowels fairly regular; takes a small dose of Russian oil occasionally and at times licorice powder at night.

#### DISCUSSION.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—We have with us to-day Professor Emerson, of Indianapolis, and I move that the privileges of the floor be extended to him to take part in this discussion. Motion seconded and carried.

DR. CHARLES P. EMERSON, Indianapolis, Indiana.—I have been intensely interested in Dr. Bainbridge's contribution, and I certainly congratulate him on his results, because, speaking from the standpoint of an internist, those are the cases where we must have the assistance of the surgeon.

From the point of view of diagnosis, I would like to ask Dr. Bainbridge if "colonic stasis" is the essential factor in these cases? Cannot these cases be interpreted in some other way? Would it not be more correct to speak of them as cases of chronic (*e.g.*, streptococcic) colitis? You may remember how many of these cases the doctor has just reported in which there was also either chronic appendicitis or duodenal ulcer, certainly the results of infection. The reason I raise the question, for I have no very positive opinion, is this: certainly colonic stasis *per se* does not lead to bad results. I remember a young man who frequently went without a bowel movement for twenty days, and it seems that this was almost normal for him. His was a case of giant colon. He did not complain of the symptoms usually ascribed to colonic stasis, and there are not a few cases on record in which we have colonic stasis without these results. We are regarding with increasing respect the streptococcus group and recent reports show that chronic streptococcus (*viridans*) infections of the bowel wall may be important in the production of arthritis. It may be that I am only quibbling this morning, when I ask the question, can these cases just reported not be interpreted as a chronic infection of the bowel wall, leading to chronic changes in

the muscularis, and this to chronic intestinal stasis and also to septicemia from the bowel wall? The treatment would in either case be the same so far as the abdomen is concerned, that is, extensive surgery, and I can indeed applaud Dr. Bainbridge when he says that the surgeon must do everything that has to be done if he expects results. But there is this difference. If we grant the point of view suggested, we certainly must, in addition to the intraabdominal operation should the case require this, pay in the future much more attention to the patient's nose, tonsils and teeth.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—Permit me to ask Dr. Bainbridge a question. My position is that of Dr. Emerson and, therefore, I ask Dr. Bainbridge to explain, in closing the discussion, those cases in which constipation is very excessive.

When still a student in the medical college, a woman came to the clinic and when Professor Graham asked her of what she complained, she replied, "I have the diarrhea." He asked her how many times her bowels moved and she answered, "About two or three times a week." Professor Graham said to her, "Did I understand you to say you have diarrhea?" She answered, "Yes, doctor." Dr. Graham looked amazed and said, "Will you please tell me how often your bowels move when you have no diarrhea." She promptly answered, "Once a month." This woman was sick when her bowels moved oftener than once a month.

There is a case on record of a French naval officer, who died at the age of fifty-two, whose bowels moved only from three to four times a year. Every time his bowels began to move he was given leave of absence for one month. When he died, postmortem showed that a short distance above the internal sphincter ani muscle the lumen of the bowel had contracted to the size of a pencil, and the descending colon measured nearly 32 inches in circumference. There are other instances of a similar character on record.

Will Dr. Bainbridge kindly explain the well being of these individuals who, in spite of the excessive constipation, lead a life of comparative comfort?

DR. JAMES E. DAVIS, Detroit.—I would like to ask Dr. Bainbridge how he arrived at his judgment of when it is necessary to rearrange the supports of the bowel? This, it seems to me, is a difficult problem to be determined in many instances.

I recall making a study two years ago of upward of 300 cases of the colon, on the dissecting table, and in about 50 per cent. of these cases the colon showed abnormalities. I am very much interested in knowing how Dr. Bainbridge proceeds when he opens the abdomen to determine just where and which bands should be released.

DR. CHARLES L. BONIFIELD, Cincinnati.—I rise to compliment Dr. Bainbridge on his very clear and thorough conception of the whole subject.

There is one element in the etiology of these cases that I want to emphasize, and that is healthy innervation of the intestines. I think every one, who has been doing gynecological surgery for fifteen or twenty years, has seen many cases where we open the

abdomen purely for a pelvic condition, such as retroversion, prolapse of the ovaries, adhesions, and so on. We have examined these patients and found the stomach dilated and somewhat low, with more or less kinking of the intestines, and possibly a bad appendix, and by simply attending to the pelvic work, and removing the appendix, if necessary, these patients are put into a condition where they get well from medical treatment. In order to bring about a cure in these cases, these patients are to be put in a condition where the nervous mechanism can be so improved as to overcome the slight abnormality in the intestinal canal. I believe the nervous system has much to do with these cases.

DR. MAGNUS A. TATE, Cincinnati, Ohio.—In reference to the transplantation of fat taken from the leg, I would like to ask Dr. Bainbridge if there is not danger of necrosis taking place?

DR. BAINBRIDGE (closing the discussion).—In reply to Dr. Tate's question concerning the possible danger of necrosis following the implantation of fat, such a possibility is not to be forgotten, and it should be forestalled by the exercise of the utmost dexterity in the handling of the tissues. A thin layer of fat, from the thigh or elsewhere, is removed, care being taken to prevent the slightest traumatism; this is placed in normal saline solution, and then transplanted. A piece of rubber tissue is put in the center for drainage. Fat has been transplanted by Binney and others on tendons, on the hand, around the wrist; on the brain, as some of the German surgeons have done, to eliminate adhesions between brain and dura, and I have transplanted it numbers of times in the abdomen with excellent results.

Replying to Dr. Davis' question regarding the application of the abdominal supports, I would refer the doctor to an article on the "Operative Treatment of Chronic Intestinal Stasis," which appeared in the United States Naval Medical Bulletin, vol. ix, 1915, in which I have described in detail, with illustrations, the application of the supports, and have dealt with the various operative procedures employed in the treatment of these cases. The question of individual resistance and acquired immunity seem to play a part in explaining why some individuals are able to maintain a fair degree of health and activity despite a marked amount of stasis and retention of effete material. Some are evidently much more susceptible than others to autointoxication under these circumstances, just as, in the case of laboratory rabbits, there has been found a difference in susceptibility between white ones and black ones. Some of the bands found in connection with chronic intestinal stasis may be congenital, many are inflammatory, but it certainly seems that the evolutionary theory of origin fits in more nearly with the mechanical estimate of the matter, as emphasized by Lane. Any classification of these structures is necessarily more or less arbitrary.

Dr. Emerson has brought up an important matter in regard to the relationship between bacteriology and chronic intestinal stasis. This is emphasized by the fact that in cases of marked stasis a pure

culture of colon bacillus may be obtained from the abdominal cavity, before the hollow organs are opened, that these organisms may be found in the urine, and that they may even be recovered from the laparotomy incision despite the utmost care in cases of delayed healing. Just what these organisms may have to do with the formation of these bands is a matter to be worked out.

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## IN MEMORIAM

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JOHN BENJAMIN MURPHY, A. M., M. D., LL. D., F. A. C. S.,  
F. R. C. S. (ENG.)

BY

CHANNING W. BARRETT, M. D., F. A. C. S.,

Chicago, Ill.

DR. JOHN BENJAMIN MURPHY, gentleman, churchman, citizen, surgeon, "founder" in the school of modern surgery, teacher, scientist, and one of our most distinguished members, has passed to his reward. Lowly of birth, struggling for position, tenacious in purpose, brilliant in achievement, he died in an active period of his accomplishment with many plans for the future unfulfilled.

Those of us who knew the man (and who of the present day did not know him) who bore the distinguished name of John B. Murphy find it difficult to identify his surname with that of the most frequent, the most typically Hibernian name of that of thousands of immigrants from the Emerald Isle; and yet this name which he carried with such knightly dignity to such a lofty height was given him by Michael and Ann (Grimes) Murphy, immigrants from Ireland and pioneers on a farm near Appleton, Wis. We would not wish to belittle or degrade the ancestry or worth of Mike and Ann Murphy, honest toilers of a pioneer soil for, certainly, if ancestry counts in the making of a man, good blood coursed through their veins for John B. Murphy lived a kingly life among his fellow men. Struggling upon the farm in those early days, fired with ambition to become a scholar he must, indeed, have been a worthy specimen of a country boy; but even the imagination of his parents and his prophetic vision must have been inadequate to perceive the full measure of his later achievements. It is said that during his first year he labored under serious handicap and that he gave very little promise, for he could neither walk nor talk. I mention this merely to call attention to the humiliation it must have been to him in after years, when he

was crowding four years' work into one, to think that one whole year passed in which he never stood up before a class of students to hammer home the truths of surgery, or never plied an embarrassed neophyte with the baffling question "What else?" But we fancy that even in these seemingly unproductive days his dominant restless spirit was preparing for its life work by plying the question in sign language to his mother. "What else?" has been the question in answer to which he has lived his life. When he filled his young years so full of toil that even his magnificent physique felt the strain, he was wont to ask "What else?" and he was made to feel the need of vacations. When he had followed a trail as far as others had blazed the way, he was not content; but his scientific mind propounded the question "What else?" and a new fact, a better method or a shorter cut was discovered. When plying a student with questions until the student had drained his cup of knowledge dry and vainly hoped that this might be sufficient, there came the disconcerting question "What else?" When one unknown skein of surgical knowledge had been unraveled and made plain, he queried "What else?" and went on to something more intricate. When a greater measure of success came to him than comes to most men, his efforts were not slackened nor his attentions diverted. "What else?" was still his watchword. When he had measured out to the world far more than his span of years could be expected to give, his indomitable spirit drove him to the breaking point still asking "What else?" "What else can be accomplished before I have to give up?"

Dr. Murphy's life stands as a rebuke to those who think that their studies of science leave no room for the conception of God. He was true to his God and the religion of his ancestors. Nothing was more a part of Dr. Murphy than his religion. He was a faithful and devout Catholic, a strong supporter of the church and its institutions, and I think, we may rightfully observe that no layman was more widely known nor more highly esteemed. He did not find his scientific studies dwarfing his religion nor his religion interfering with his science.

Dr. John B. Murphy was born at Appleton, Wis., December 21, 1857, educated in the public schools of his community and the Appleton High School, and taught school to further his education. As a student his earnestness must have made him the pride of his teachers; but we cannot doubt that he was oftentimes disconcerting. As a teacher we cannot but believe that his pupils were treated to the best brand of zeal and enthusiasm that they had ever witnessed



**PLATE I**

**AMERICAN JOURNAL OF OBSTETRICS  
AND  
DISEASES OF WOMEN AND CHILDREN  
FEBRUARY, 1917.**



**JOHN BENJAMIN MURPHY, A.M., M.D., L.L.D.**

**BORN DECEMBER 21, 1857.**

**DIED AUGUST 11, 1916.**



and no student under Dr. Murphy's medical teaching doubts that those early pupils were led to tell all they knew and more.

He entered upon the study of his chosen profession with no handicap of wealth or inherited social position. He had the early advantage of a training in necessary industry which, with a well developed, rugged endurance, fitted him for his years of endless toil which to him was a pleasure. He graduated from Rush Medical College in the class of 1879, and won the coveted "first place" as interne in Cook County Hospital, which position terminated in October, 1880. As a student and interne his career was marked by earnestness, close application with a devouring appetite for work. He had little money to spend and less inclination to frivolity. He set a new mark in hospital work that was long remembered as the "Murphy method."

He began to practice medicine in association with Dr. Edward Lee, immediately after leaving the hospital, when a little less than 23 years of age. During the next few years he, like his associate, became a strong factor in medical affairs of the Irish settlement in the Halsted and Blue Island section of the city of Chicago.

In 1882 Dr. Murphy began an eighteen month's medical study tour in Europe, returning in April, 1884, with his professional knowledge much matured. He may have had his faults; he certainly had opponents; but his career was marked by brilliant achievements from that time until his death. With his general practice in the early days, he found much of his time taken up with operations in private houses. He became known very quickly as a bold, brilliant, yet careful surgeon. Soon he began to deliver trip hammer blows against the old effete order of things, blows backed up by experimentation and clinical experience. His early contributions to the surgery of the appendix are well known. How he laid the foundation for this work in house to house surgery, when other clinicians of large experience were not recognizing a single case of appendicitis, is not so well understood. In these operations he personally supervised and helped in the cleaning of the rooms in private houses. When scarcely past 30 years of age he defended his position against the united opinions of the "powers that were," but in this sense Murphy was never young.

As we review his chief writings we find them masterpieces. It was not his nature merely to go to the bottom of a known subject. He explored intricate subjects to greater heights, deeper depths, and broader breadths. His elucidations gave them new meanings. We cannot undertake a complete review of his medical publications; but

some of them stand out prominently in the making of modern surgery. Among the first to receive wide recognition were his powerful essays on abdominal surgery: "Gunshot Wounds of the Abdomen," "Early Operation in Perityphlitis," "Early Operation in Appendicitis," "Ileus, its Diagnosis and Treatment," "Original Experimentation Researches in Surgery of the Gall-bladder and Intestinal Tract, Illustrating the Use of the Anastomosis Button." An article which has been widely quoted is the one on "Tuberculosis of the Female Genitalia and Peritoneum." His work on "Surgery of the Blood-vessels, Resection and End-to-end Union of Arteries and Veins Injured in Continuity," and his "Surgery of the Lung, Experimental and Clinical," and "Surgery of the Nervous System," were of more than ordinary interest.

In later years came his monumental works on "Osteoplasty," "Arthroplasty," and "Surgery of the Bones, Joints and Tendons." These works threw him, during the last decade of his life, into a field of arduous physical labor which called for more endurance than any other kind of surgery. If the above classical works were all destroyed there remains enough of his painstaking writings upon the surgery of the face, liver, prostate, etc., that would cause future generations to rank him with the giants of his day.

As a teacher of clinical surgery by word of mouth, he was conceded to be one of the greatest, if not the greatest, the world has produced. Into the West came Fenger with his marvelous knowledge of dead-house pathology. Out of Wisconsin came Senn with his fund of experimental pathology; but to his ripened years of teaching, Murphy brought a wealth of knowledge of living clinical pathology with a capacity for therapeutic application not surpassed, if even equalled, by either of the other two surgical giants of the middle west.

Dr. Murphy was not only an individual worker but a strong factor in organized medicine. He was a member of local, state, national and many special societies. He was president of The Association of Military Surgeons, The Chicago Medical Society, The American Medical Association and the Clinical Congress of Surgeons. He was a life member of the Deutsche Gesellschaft für Chirurgie, honorary member of the Société Chirurgicale de Paris, and Fellow of the Royal College of Surgeons, London. He received the great distinction and honor of being made Knight of the Order of St. Gregory by the Pope.

Wherever Dr. Murphy appeared upon the platform or floor in medical gatherings, he was a commanding figure, and master of the

situation. While presiding at the meeting of the Clinical Congress of American Surgeons, London, 1914, one of the suffragettes, who at that time attracted a good deal of attention in England, forced herself before the meeting, took the floor, and well nigh put the essayist speaking to rout. Dr. Murphy quietly directed her removal. One of the Fellows, a tall and stalwart figure, took the lady gently upon his arm, like a father would his child and carried her out of the hall. Murphy then walked to the front of the platform and with impressive dignity said: "Gentleman, it is the opinion of your chairman that the previous speaker was out of order." This unexpected sally led to prolonged applause followed by an orderly return to the work of the evening.

With Dr. Murphy every hospital position has been a teaching position and in this line of teaching his greatest work has been done at Cook County Hospital, Alexian Brothers Hospital, and Mercy Hospital, with the latter of which hospitals his chief clinical work has been connected in the last decade.

He has been connected with the College of Physicians and Surgeons, Rush Medical College, and was the Surgeon at the Northwestern University Medical School at the time of his death. He was a tremendously forceful teacher and, perhaps, no man in this country has left a greater impression upon his students. His death is a loss to the clinic in Mercy Hospital and will be felt by the medical students of that section as well as by the visiting surgeons from all parts of the globe.

What manner of man was Dr. Murphy that he could accomplish these things? He was a man of commanding figure of more than average height; erect and alert, physically and mentally, at all times. He was always kind, at times warm, frequently witty, and yet serious. There was too much to be done to be frivolous. His mind was fertile, adaptable, penetrating and analytic. He was possessed of what might be termed organized restlessness. He seemed ever to be doing. He was a human dynamo. No little of his great achievements were made possible by his ability to organize his assistants to do much of the detail. He planned his life so that his family and associates could tell within a few moments what he would be doing; all adjusted themselves to those few minutes so that no time was lost. It is to be regretted that these plans left no moments for systematic relaxation and exercise.

He had a directness in reaching and dealing with patients that sometimes did not take account of the "other fellow" although it must be said that it was seldom, if ever, to the patient's detriment.

These methods of directness were sometimes in question, but the tremendous respect of the profession for his ability usually overweighed the criticism. In spite of criticism, he exerted a magnetism that was contagious. He drew the loyal respect of the profession, he attracted the attention of laymen and drew help from the lay press as has no other man in Chicago and, with one or two exceptions, as has no other man in the country. For this he had his critics, but his inherent worth to the world and to the profession is not obscured by this subtraction.

In the operating room he bristled with cold efficiency. He had no patience with a man or instrument that failed to do his or its work at the right time. He believed in efficiency to the extent of having every useful appliance backed up by another of the same kind regardless of cost. In the dressing room he was careful and thorough. His hospital walks were marked by hurried suggestions of optimism; his office work was businesslike. In his home much of his time was taken with dictations and consultations with his helpers and collaborators; and yet here he relaxed and the embers of his nature glowed warm, and tender and bright.

In November, 1885, when 28 years of age, Dr. Murphy married Miss Jeannette C. Plamondon of Chicago. To them were born five children, Harold and Jeannette dying in infancy, Cecile J., Mildred L., and Celeste remaining.

Dr. Murphy, as has been pointed out, was a tireless, ceaseless worker; but at his side has ever been Mrs. Murphy, brilliant, devoted and helpful; together they have achieved, and while they were well known in society, he has never divorced himself from his work to become a club or society man.

After a summer of failing health, Dr. J. B. Murphy passed away on August 11, 1916, at the age of 58 years. No greater evidence of the esteem in which he was held could be offered than the sight of the host that gathered at his funeral.

To those who have been fortunate in knowing Dr. Murphy, these lines are unnecessary and perhaps disappointing. They not only know that he was a great surgeon and teacher, but they know that he would have been great in any work big enough to absorb his interest. To those who have not known him, and those who shall see his name in after years, we would say that Dr. Murphy stands in our minds in stature, in character, in restless energy, in analytic and penetrating mind, in devotion to duty, in self-reliance, in scientific honesty, in brilliant achievement, a superb example of the best type of surgeon of his day. If you ask

me how to become a great surgeon, I could well say: Study carefully the life of John Benjamin Murphy and do likewise.

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## IN MEMORIAM

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FRANK DE LOS GRAY, M. D., F. A. C. S.

BY

GORDON K. DICKINSON, M. D., F. A. C. S.

Jersey City, N. J.

As in the forest one tree pushes itself way above the others, meeting the storms, bluffed by the winds and the rains, and yet warmed by the congenial sun, thus being touched by Nature differently from the others, bringing a straighter bole and a stronger growth, so Dr. Gray, born in poor circumstances, brought up by a firm, honest father and a warm, loving mother, developed characteristics which made him a great, noble, ethical man. He was sensitive by nature, truthful in thought and word, and ever ready to take a foremost place in professional and civic life.

Frank De Los Gray was born in Riceville, Crawford County, Pennsylvania, July 17, 1857. His father, J. W. Gray, was a typical village blacksmith of a period when craftsmen took honest pride in their workmanship and were not infrequently leaders in the life of the community. He was a man of general reading, did his own thinking, and was a ready and convincing speaker. He was a hard hitter, not only on the anvil but in every cause which enlisted his sympathies. His wife, Mary Adelia Crouch, was a schoolteacher of the then frontier, whose gentle nature, broad sympathies and unpretentious piety are still remembered by the inhabitants. It was from this stock that Frank De Los Gray inherited his noble qualities and in this environment grew up, acquiring from his father the great value of truth and an irrepressible tendency to hit and to hit hard at that which was irregular; and from his mother he inherited his kindly sweet nature which never did harm to any one, never caused him to speak ill of a professional brother, and which aided in the development of the younger mind and as he met him.

His youth was passed in the peaceful hills of western Pennsylvania. At the age of fifteen years it became necessary for him to do his share in the support of himself. He was placed in charge of the

primary grade of the public school of his home town. The following year he went to the Kerrtown School, a town near Titusville, Pennsylvania, and the following year was chosen principal of the Riceville Schools. Thereafter, for several years, he alternated between teaching others and going to school himself. Like many another self-sustaining young man of that day, he found in the educating of others the readiest means of providing for his own education. It was thus that he was enabled to secure the advantages of such excellent institutions as the State Normal School at Edinboro, Pennsylvania, and Allegheny College at Meadville.

Having decided upon the practice of medicine as a profession, he chose Dr. A. P. Wald, of Spartansburg, as his preceptor, in 1879. Like many a man, who later in life became a surgeon, he was in the beginning so sympathetic in nature that the witnessing of an operation or the sight of blood would make him faint. He entered the medical department of the University of New York in 1881, and graduated in 1884. Immediately after that he was appointed interne in the Jersey City Hospital. It was here that I first became acquainted with him; he an interne, myself one of the attending surgeons.

The attending staff of that hospital were men of congenial natures. Those being the days of opinions and not of scientific medicine, opinions prevailed and were as diverse as the practitioners. This gave Dr. Gray a wonderful opportunity to pass judgment on the fads, beliefs and errors of the attending staff. One of the members, a great big, good-natured plodder in medicine, was Dr. Beriah A. Watson.

Shortly after leaving the Jersey City Hospital, Dr. Gray became Dr. Watson's assistant and his office clerk. He not only helped Dr. Watson in his practice, which was one of emergencies, but spent a great deal of his time reading and collaborating with him in literary work. Dr. Watson was a well-known surgeon; a writer of valuable medical books, and one of the pioneers in animal experimentation. Being a progressive man, he was continually the object of attacks. It was in such an office that Dr. Gray's character was developed and his skin toughened for the warfare of professional life; none was better adapted to take advantage of the military discipline and scientific outreaching which Dr. Watson always meted out, than was Dr. Gray, for he was naturally a student, very practical, slow of judgment but comprehensive in all things.

The qualities possessed by Dr. Gray, nurtured by the surroundings of his early life, naturally developed that which made him



desirable in the profession and in the community, so that it was not long before he was called upon to serve in higher and more useful capacities.

Dr. Gray married Miss Katherine Atkinson, daughter of one of the Methodist ministers of Jersey City.

In 1888 he was appointed surgeon to Christ Hospital, a small striving institution which has since grown to a position of prominence in the State. Not long after that he was made surgeon in the Jersey City Hospital, where he served his internship. In 1901 he was appointed consulting surgeon to the North Hudson Hospital and was virtually the medical director of that institution. He remained in these two institutions until the time of his death.

Such was Dr. Gray's judgment, poise, and civic influence that, in 1906, the Mayor of Jersey City, Hon. Mark M. Fagan, appointed him a member of the Board of Health, and made him chairman of the building committee of the new city hospital. As a result of the doctor's tireless endeavors the present hospital building was erected.

Dr. Gray was one of the organizers of the Practitioners' Club of Jersey City, a club which has done more than any one influence to better conditions for and cement the members of the medical profession.

Early in his professional life he joined the County Medical Society as well as that of the State. In both he was frequently on his feet, always ready to participate in the discussion. He had a keen business sense and led in the business affairs of the societies. He had been president of the Practitioners Club; in 1915 he was made president of the State Society. It was generally conceded that his parliamentary tactics, his handling of emergencies and fair-and-square methods of dealing with matters of importance were remarkable and satisfactory.

In 1915 the County Medical Society tendered him a testimonial dinner presided over by Dr. H. Amory Hare of Philadelphia, and attended by men of prominence. It was a fitting testimonial to the worth and usefulness of the man who, in so many ways, had put his life into the public weal.

Dr. Gray was elected a Fellow of the American Association of Obstetricians and Gynecologists in 1913, and has contributed in that short time several excellent papers which brought out highly interesting and profitable discussions. The same year he became a member of the American College of Surgeons and later one of its state censors. He was also a member of the New York Chapter of the Alpha Mu Pi Omega.

Dr. Gray's literary tastes were satisfied by writing numerous papers on medical topics, all of them well studied, couched in excellent English, and covering the subject thoroughly. His papers were always filed for reference, for they were always of importance and there was never anything in them which was trivial.

Of all those we meet in the practice of medicine, none had a better idea of professional ethics than Dr. Gray. Being a gentleman, ethics came to him naturally. Being brought up by a military surgeon, his mind ran true, and his instincts and conscience always led him to do the right thing at the right time.

Dr. Gray was a lover of books. He was a man of system, orderliness and tidiness—all of which are essential qualifications of the good surgeon. He had an esthetic sense. Any one visiting his office would be impressed by the conditions there. With him mental action meant activation of the entire body. As his mind worked, his body strained. He gave to his patients not only thought but, practically, his life.

Dr. Gray was clean in language, careful in expression, and ever ready to develop the truth. He was loyal to his friends; but loyal first to his principles. He filled a place with us that was unique.

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## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

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*Meeting of October 24, 1916.*

*The President, JOHN O. POLAK, M. D., in the Chair.*

DR. JOSEPH BRETTAUER presented a specimen of

### ADENOCARCINOMA OF THE BODY OF A FIBROID UTERUS.

The specimen was obtained by abdominal hysterectomy performed on F. B., an unmarried woman, aged forty-three on Oct. 3.

The patient was operated upon eighteen years ago for acute appendicitis; this was followed by a pelvic abscess which was drained through the rectum. Since that time she has been perfectly well. Her sister was operated upon for fibroids after years of menorrhagia which resulted in severe anemia.

Beginning in May, 1916, the intermenstrual period became shorter, the flow lasting longer and becoming more profuse. From July 15 to Sept. 20, the date of her last period, she flowed continuously, at times quite profusely. There was a serosanguinous discharge

PLATE II

AMERICAN JOURNAL OF OBSTETRICS  
AND  
DISEASES OF WOMEN AND CHILDREN  
FEBRUARY, 1917



**FRANK DE LOS GRAY, M.D., F.A.C.S.**

**BORN JULY 17, 1857.**

**DIED JUNE 11, 1915.**

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from the cervix. A feeling of general debility, increasing gradually, was present. She was very anemic in appearance, hemoglobin 50 per cent., red blood count 3,500,000. The severe anemia, following the comparatively short period of menorrhagia, caused a suspicion of a more serious lesion than a possible submucous fibroid and therefore treatment by x-ray, which I have favored for the past few years in selected cases, seemed inadvisable without a preliminary curettage.

The uterus was the size of a two months' pregnancy, globular in shape owing to a large nodule in the left corner, with multiple fibroids in its walls and a large ulcerated area of infiltrating adenocarcinoma in the right cornu.

The reason for presenting this specimen was to again emphasize the necessity for exact diagnosis before resorting to x-ray treatment.

DR. FRANK R. OASTLER, in opening the discussion, said: "I was going to ask the privilege of presenting a case myself which was similar to this case in every respect, but thought I would rather discuss and introduce my case in the discussion of Dr. Brettauer's case."

"This case, which was very similar to Dr. Brettauer's was in a woman thirty-eight years of age. Last February she came under the care of one of our eminent gynecologists of New York and her condition, as the result of three monthly hemorrhages, was so bad that he was fearful of operating upon her after having made a diagnosis of fibroid tumor of the uterus and advised her to have x-ray treatment in preference to operation on account of her anemia. She accepted his advice and for a period of four months she was subjected to x-ray treatment for hemorrhage. During the first three months the amount of bleeding during the periods apparently diminished. By the fourth month her anemia did not clear up as they wished it might under the administration of iron and arsenic, and when she eventually came under my observation in September she was brought to the hospital practically in an exsanguinated condition, very short of breath, absolutely white, practically pulseless (you could feel her pulse, but it was counted with difficulty), and with a history that she had had extreme bleeding for a period of two days at her regular period. As soon as we got her in the hospital we took a blood count and found 15 per cent. hemoglobin and 1,600,000 red cells. She was in such miserable condition we infused her at once and she rallied a little bit from the hemorrhage. I examined her at the time and found a mass protruding from the cervix composed of a large polypus, and, by the way, the doctor whom I called on the telephone said at the time he examined her that it was in the uterus and had not protruded out through the cervix. I packed the vagina as tightly as I could and gave her the usual remedies. The bleeding ceased and her pulse improved a little bit, but she was in such an extremely miserable condition that she did not seem to me to be sufficiently well to warrant my doing anything. We transfused her and gave her 1000 c.c. of blood by the sodium citrate method and following that her

blood count rose to 2,600,000 and 45 per cent. hemoglobin. She improved very much apparently and the transfusion of blood did her very much more good than the infusion of salt solution. She stopped bleeding and last Friday (her next period was due this coming Thursday) I thought it was a good opportunity to go ahead and I did what was practically a vaginal hysterectomy, stripping up the bladder, splitting up the uterus and removing the tumor, which proved to be a large fibroid, without any bleeding, and she has been all right ever since.

"The interesting thing about the tumor is that what apparently seemed to be nothing but a large fibroid which had been delivered through the uterine canal, proved to be sarcomatous on section. The x-ray treatment which had been advised proved to be absolutely ineffectual."

DR. HOWARD C. TAYLOR.—"I would like to ask Dr. Brettauer if the operation was a supravaginal or complete hysterectomy."

DR. BRETTAUER.—"There was a small part of a virginal uterus left, which had the specimen been opened at once would have been removed also."

DR. HOWARD C. TAYLOR.—"I consider it necessary when asupravaginal hysterectomy is done for a fibroma uteri to open the uterus before the completion, otherwise occasionally a malignant condition of the fundus uteri might be overlooked and not discovered until the specimen was examined in the laboratory and the cervix would not have been removed as is best in a malignant disease in the fundus of the uterus. There was one other point which Dr. Brettauer did not make clear to me. He said that the sister of the patient said, 'Since I am to go under an anesthetic for a thorough curettage, why not remove the uterus at the same time instead of doing a curettage?' If I understood Dr. Brettauer correctly he said he was very glad to agree to that. In other words, are we to understand that he is willing to remove the uterus because the patient wishes it, or that he feels that while the patient is under the anesthetic we might just as well do a hysterectomy as a curettage? I would like to ask Dr. Brettauer to describe more fully his indications for curettage and x-ray treatment for fibroid tumors of the uterus and those for an hysterectomy in the same condition."

DR. J. BRETTAUER, in closing the discussion, said: "With the present methods, using the Coolidge tubes, the period of x-ray treatment is considerably lessened, the exposures are of shorter duration and the results are very satisfactory. However, I have never used x-ray treatment on any patient for four months continuously unless I was absolutely sure of the diagnosis. The x-ray treatment is as widely known in this country to-day as it was in Germany five years ago. Patients seem less afraid of it than of operative interference. The symptoms presented in this case were of such a character that although I was asked by the patient to subject her to x-ray treatment, I would not consider the proposal without a preliminary curettage. Only when she was informed that anesthesia would be necessary, was the advice for radical operation accepted."

DR. LAWRENCE W. STRONG presented a case of

#### FUNGOID POLYPOSIS OF THE ENDOMETRIUM

with specimen, which was described as follows:

The uterus is slightly enlarged. On opening the uterus the entire endometrium is replaced by a fungoid ragged tissue which gives no sign of invading the myometrium. This is not localized in the form of a tumor but is diffuse over the entire endometrium. Its gross appearance suggests malignancy, but the microscopical sections taken from several locations do not justify this opinion.

The sections show first an increased growth of the glands which, however, are not invasive or destructive of tissue. The cells lack polarity but do not break through the basement membrane. The outlines of the glands are very irregular. The chief change in the endometrium is stromal and consists in a diffuse hyperplasia without optical unrest, these cells being chiefly spindle-shaped and homogeneous, thus, although there is tremendous hyperplasia of both glands and stroma neither element passes the bounds of benignity.

A second piece of tissue was received several days subsequent to the hysterectomy having been sloughed off before the operation and having been delayed in reaching the laboratory. When this was examined macroscopically it was not noticed that this tissue belonged to the uterus above described, so that an opinion unbiased by the previous examination was made upon it, this tissue microscopically gave an unmistakable picture of a mucous cell sarcoma, there being many giant cells and great irregularity in the size, shape and mitoses of all the cells.

The interesting feature of this case is, that it is an illustration of the fact that neoplasms are not fixed entities, that it is not true that a tissue must be either carcinoma respectively sarcoma, or not carcinoma or sarcoma, but that there is a stage in which a tumor is in process of becoming a carcinoma or sarcoma. We often can make this as an inference but here we have a case where the two conditions were received separately and it was not realized that they were from the same case.

DR. STRONG also presented

#### A CASE OF OVARIAL CARCINOMA

with metastasis *in utero*, with specimen.

The uterus is somewhat enlarged. On section there protrudes from the fundus a broad based polypus 5 cm. in length. This looks like a submucous myoma, but on section the tissue is fleshy, reminding one of a sarcoma. The ovary of this case is enlarged, chiefly due to a thin-walled cyst, but on section there appear certain solid portions of ovarian tissue which suggest a carcinoma. The interest of this case lies in the simulation of a sarcomatous polyp in the

uterine mucosa. This is in reality a carcinomatous metastasis from a primary tumor in the ovary. Such metastases are not unusual in ovarian carcinomata.

DR. ROBERT T. FRANK.—“I would like to ask Dr. Strong whether the material which was expelled from the uterus was in a good state of preservation?”

DR. STRONG, in answer to Dr. Frank's question, said: “It was in a good enough state of preservation so that there is absolutely no question about the structure.”

DR. ROBERT T. FRANK, then said: “It seems very peculiar that the material from the primary site of the tumor showed nothing malignant, and as the diagnosis of carcinoma of the uterus is hard to make, if the preservation of the tissue is poor, I should feel inclined to be very reserved in deciding such a point.”

DR. STRONG.—“If Dr. Frank were to see the sections themselves he would have no doubt about it whatever. The stroma of the original tumor is perfectly regular. The cells are all small and conform to a simple hyperplasia. You couldn't make it out as anything else. The other section, which is perfectly well preserved, shows many giant cells. It is a solid mass of tumor.”

DR. S. H. GEIST, reported a case of

**SUPRAVAGINAL HYSTERECTOMY FOR SARCOMA OF UTERUS INVOLVING  
ROUND LIGAMENT AND INGUINAL CANAL. NO RECURRENCE  
FOURTEEN MONTHS AFTER OPERATION.**

“Sarcoma of the uterus may have one of three origins, either from the endometrium, the myometrium or from a pre-existing fibromyoma. Those tumors arising from the structures of the endometrium are usually considered to be most malignant, while those arising from the transformation of a fibroid give as a rule a better prognosis.

“Last year I described two cases of sarcoma developing in fibroids one a case of the late Dr. Samuel Brickner and the other of Dr. Vineberg that recurred in less than six months after a supravaginal hysterectomy with fatal termination.

“The frequency with which sarcomata develop in fibroids varies, according to different authors, from 1 to 5 per cent. There is very little, as a rule, that will help in making an absolute diagnosis but the history of a preëxisting tumor which suddenly develops rapidly in size is suggestive. Then there are the usual pressure symptoms and if the tumor becomes submucous in position there is often a profuse hemorrhagic foul discharge.

“The treatment should be complete hysterectomy though Cullen states that the immediate results following hysterectomy for sarcoma are not very gratifying.

“The case that I wish to present to-night is one of interest because of the favorable clinical behavior after an incomplete operation for a very extensive malignant tumor.”

Mrs. E. L., Austrian, married, aged forty-eight, admitted to the



service of Dr. Brettauer July 10, 1915. Discharged August 5, 1915. Family and past history unimportant. Menstrual history normal. Last period began day of admission. Marital history, twenty-six years, husband living and well. Four children living and well. Two miscarriages. Last child seven years ago.

*Present Illness.*—One and a half years ago noticed swelling of abdomen. For six months frequency of urination, twice at night. Profuse white discharge for past six months especially before period. Three days ago severe right-sided pain, slight fever, feeling of weight in pelvis with occasional twinges of pain in limbs. No menstrual disturbances.

*Physical Examination.*—Few varicosities on each leg. Abdomen enlarged to size of eight months' pregnancy. Large, hard, nodular mass more on right side than on left extending down to inguinal canal on right side. On left there are several hard nodules. Temperature 100° F., with blood count, 8800, polys 84 per cent., hemoglobin, 70 per cent., blood pressure, systolic, 116, diastolic, 66.

*Vaginal Examination.*—Menstruating. Moderate rectocele. Cervix high up behind symphysis and far to left. There is a hard mass reaching three fingers above umbilicus in median line, more prominent on right than left, not movable. Left portion of mass apparently communicating directly with cervix. Diagnosis—fibromyoma.

*Operation.*—Gas and ether. Supravaginal hysterectomy. Bilateral salpingo-oophorectomy. Suture of bladder. Five-inch right paramedian incision later enlarged by an additional inch. On opening the abdomen a large intraligamentous tumor, semifluctuant in character to right of uterus was seen. Both adnexæ were free. Left infundibulopelvic and round ligaments tied with silk. Uterine vessels also. Cervix cut across till region of right uterine vessels approached. Right infundibulopelvic ligament clamped and cut. Peritoneum over tumor cut and an unsuccessful attempt made to shell out the tumor. Right round ligament clamped and cut. The tumor freed bluntly above and posteriorly. Uterine vessels ran directly into the tumor and on cutting and tying them, the tumor was made movable. The tumor extended along the right round ligament into the inguinal canal for a short distance. The bladder was pushed back on the right side where it was adherent and in freeing it a defect was produced. The tumor was freed quickly and the inguinal extension dissected as far down as possible. A large lymph node over the iliac vessels also removed. The tumor was injured in removal and the tumor tissue spilled into the pelvis which, of course, had been packed off from the general peritoneal cavity. After the removal of the tumor the bladder was repaired by using plain catgut through the entire thickness of the vesical wall, this covered by two layers of perivesical tissue with interrupted catgut. Cervix split. Two gauze packings into pelvis. Right ureter had been dissected free for  $2\frac{1}{2}$  inches. Peritoneum of bladder and cervix united over bladder suture and the sigmoid also utilized to cover the bladder suture. Gauze and stump extraperitonealized. Abdominal viscera showed no metastatic involvement. Abdomen

closed in routine fashion. Petzer catheter. Operation two hours. The condition of the patient did not permit a more extensive operation, including removal of cervix.

Specimen consists of uterus, adnexæ and tumor. The adnexæ except for a cyst 2.5 cm. in diameter in the right ovary, are normal. The uterus has been amputated through the cervix. It is slightly enlarged. Mucous membrane, pale and somewhat thickened, Uterine cavity slightly dilated. Occupying the right broad ligament and springing from the right uterine wall, is a large lobulated tumor of different colors. Color ranging from yellow to brownish red. The tumor measures 10 cm. in its longest diameter. It has developed intraligamentously extending from below the cervix up to and around the round ligament. The yellowish portions represent necrosis. The reddish brown are hemorrhagic. Infiltrating into the uterine wall is more tumor tissue of a somewhat grayish-white appearance suggesting sarcoma. Lymph node is enlarged and shows no apparent involvement by tumor tissue. Histologically, sarcoma of mixed cell type probably arising in fibroid which seems very rapidly growing and malignant in type. Lymph node shows involvement by tumor.

Wound healed by primary union. Slight induration of right inguinal region on discharge. Pelvis empty, cervical stump movable.

Convalescence was uneventful. She later developed a cystitis when a suture cut through into bladder and was removed through cystoscope eight months later. She is now well.

The interesting facts to be emphasized are the following:

1. The comparative freedom from symptoms until recently.
2. The cutting through of the bladder suture which presumably was of plain catgut.
3. The absence of abdominal or pelvic implantations even after soiling the peritoneum.
4. The good result after an incomplete operation for an extensive tumor of malignant nature.

DR. ALBERT M. JUDD, opening the discussion, said: "Of course, as we all know, the malignancy of a sarcoma varies according to the pathology. Whether we are dealing with a melanosarcoma, a spindle-celled sarcoma, a round-celled sarcoma, an alveolar sarcoma or a giant-celled sarcoma, the doctor has a remarkable case, and I wish to report one that I have in my own histories—a spindle-celled sarcoma of the genital tract of the vagina in a young woman twenty-two years of age, two months pregnant at the time of operation. She had a sarcoma of the anterior wall of the vagina, the size of two fists, which was well encysted and was removed without very much trouble. That was five years ago and the woman is perfectly well at the present time."

DR. LEROY BROWN.—"I would like to have Dr. Strong give us some idea as to the relative malignancy of the various types of sarcoma. My last experience was some eight months ago and I presented before this Society a sarcoma in which there was a com-

plete removal of the uterus with a sarcomatous fibroid and in which the patient made an uninterrupted recovery. Some four months later in the follow-up system, which we pursue at the hospital, she had had no recurrence whatever at the site of operation. Some two months afterward she returned to the hospital with a large recurrence over one shoulder. A month later she was dead. In this instance there was no recurrence at the site of operation."

DR. JOHN O. POLAK.—"Will Dr. Strong also answer a question which I would like to ask, *i.e.*, can these growths be grafted? Dr. Geist stated that he had spilled some of the contents of this growth in its removal. I was of the impression that they cannot be or were not, as a rule, grafted, but I wish to have the opinion of a pathologist."

DR. LAWRENCE W. STRONG.—"The general principles obtain that the malignancy of a sarcoma varies with the degree of development of the cells of which it is composed. The more embryonal the type of cell the more malignant is the growth itself. In other words, a muscle cell is much more developed than the similar connective cell composing the stroma. Sarcoma found in the mucosa of the uterus is generally more rapidly growing than that in the myoma because the myoma or muscle cell is of a higher type of development. A fibroid sarcoma, that is to say, of a distinct fibrous connective tissue, is less rapidly growing than the more embryonal type. Another principle is that the more varied the types of cell and the more irregular they are, the more malignant is the disease. If the sarcoma is heterogeneous, if there are several types of cells, it may be found to be more rapidly growing than if the type be of one single cell. The other point raised by Dr. Polak as to the question of grafting in these growths depends chiefly on the distribution as to whether it is by the lymphatics or blood-vessels, and as sarcoma is supposed to grow chiefly through the blood-vessels it is less likely to be transplanted. That is the only distinction, however, and of course it does not strictly apply to the sarcoma."

DR. SAMUEL H. GEIST, in closing the discussion, said: "There is just one point which I desire to touch upon and that is as to the histology of this particular tumor. It was probably, as Dr. Strong says, of a heterogeneous type. The laboratory reported it as a mixed cell sarcoma. Histologically it gave a very rapidly growing malignant appearance, but clinically it did not bear this out."

DR. RALPH M. BEACH, presents a paper on

#### TRAUMATIC SEPARATION OF THE SYMPHYSIS PUBIS.\*

##### DISCUSSION.

DR. F. A. DORMAN, opening the discussion.—"These cases are not so very common. We should realize, however, that there are a certain number that are possibly nearly spontaneous. One of the constant complaints that I meet with in antepartum patients

\* For original article see page 203.

is the complaint of sacral pain from the loosening of the sacroiliac joints. A very large percentage of our cases suffer more or less from a relaxation of the joints, even including the symphysis. I remember the first case which I saw. There was marked relaxation of the pubic symphysis. The woman walked into the dispensary with painful gait and called our attention to the localized pain over the pubic joint and as she moved you could feel the bones move definitely on each other. That occurred in every subsequent pregnancy. After the pregnancy was over, however, there was nothing left of the condition, she was perfectly normal and the joint was comfortable. I think then that we ought not to always put the blame up to the delivery. I feel they are there ready to loosen with very little trauma. On the other hand, in difficult labors, we may see a break occur. In connection with this case I recall one some months ago in which I delivered a short stocky woman who had gone over time nearly two weeks. When the patient presented herself to me she was in labor and the head was high above the brim of the anterior pubic ridge. I delivered her after dilatation by internal podalic version with considerable difficulty until I got to the after-coming head. I got it through with the employment of much force and in the course of three or four days the baby died, evidently of cerebral hemorrhage. The woman suffered with terrible pain referable to the sacroiliac and pubic joints. She found it very difficult to move without assistance, even in spite of pelvic support, and for months after she complained of pain after getting up. I think many of these cases are ready to invite separation with slight trauma, and I believe in others it may occur spontaneously."

DR. ALBERT M. JUDD.—"I think the remarkable thing about Dr. Beach's case is the fact that she has no sacroiliac pain. I have a case under observation at present where the separation of the symphysis was not so great as in Dr. Beach's case, and this woman had, aside from the separation of the symphysis, a tearing of the bladder (vesicovaginal fistula), which was repaired last May. She left the hospital with an apparatus in the shape of a binder, holding her symphysis well together, which I understand this fall from her attending physician she has removed during the summer and she now has distinct sacroiliac pain. I shall be very glad to report this case further to the Fellows as I believe these cases should all be put on record."

DR. JOHN O. POLAK.—"One very interesting point which Dr. Beach did not bring out, although I was in hopes that he would, is that in having the woman stand up the ends of her symphyseal separation were brought practically together, while when she lies down he shows you that there is a considerable degree of separation present. That brought back to my mind and I presume also to Dr. Taylor and others who had the opportunity of seeing these patients on whom pubiotomy had been performed in Dr. Doederlein's Clinic, cleaning and scrubbing the floor on the eighth or ninth day after operation, showing that when the woman was on her

two feet the ends of the symphysis were closer together than when lying down."

DR. GORDON GIBSON, reported a case of

TRANSPLANTATION INTO THE BLADDER OF URETER INJURED DURING  
VAGINAL HYSTERECTOMY.

Mrs. C. D., aged sixty-two, para-vii, was admitted to the Gynecological service of St. Peter's Hospital on May 1, 1916, complaining of vaginal bleeding. She passed the menopause ten years ago without trouble and remained well until three months before admission when she began to have a bloody vaginal discharge. This continued for one week. About April 1 she began to flow again and this continued up to the time of admission. Examination showed an epithelioma of the cervix of the everting type with very little infiltration of the right parametrium. Vaginal hysterectomy was done on May 4 by Dr. Todd by the clamp method. The clamp on the right side was placed far out on the right parametrium so as to get well beyond the infiltrated area. The immediate convalescence was uneventful but two weeks after operation urine was leaking into the vagina. She was discharged and instructed to come back in one month for further treatment.

She was readmitted on June 30 and examination at that time showed that the vaginal vault was well healed and that urine was coming through a small sinus at the right of the vaginal scar. Cystoscopy showed no opening into the bladder and the catheter was arrested about half an inch up the right ureter. A sound in the sinus bulged the posterior bladder wall forward. Diagnosis: right ureterovaginal fistula. We decided to transplant the right ureter into the bladder if possible. On July 6 the abdomen was opened. There was no evidence of extension of the malignant process and the right ureter was found caught in the scar of the vault of the vagina. This was dissected free and transplanted into the bladder by a method which I learned from Dr. Bissell. A Bozeman dressing forceps was passed into the bladder through the urethra and the point brought to a spot on the posterior surface of the bladder which could be reached by the ureter without too much tension, the bladder wall was incised, the forceps pushed through, opened and the end of the ureter placed in the grasp of the forceps. The ureter was then pulled into the bladder and sutured to the bladder wall with fine Pagenstecher thread and catgut. The peritoneum was brought up about the ureter and the abdomen closed. The recovery was uneventful, she was up on the fourteenth and home on the twentieth day and is well at the present time with no signs of recurrence of the malignant disease and a normally functioning urinary tract.

DR. HERMANN GRAD, in opening the discussion, said: "I wish to report a case of ureter implantation. The technic in the case varied from that of Dr. Gibson's in this way. I implanted the ureter on the top of the bladder (I think that is preferable on account of better drainage), and before I fed the ureter into the bladder I

split the walls of the ureter in two halves and stitched the ends to the sides of the bladder wall. I think healing takes place better in that way, otherwise the technic was the same as that in the case reported by Dr. Gibson. A pair of uterine forceps is passed through the urethra, select the point on the bladder wall where you want to make the puncture and through this opening the ureter is pulled."

DR. H. D. FURNISS.—"I believe in these carcinoma cases, especially where there has been extensive dissection of the ureter, that the operation is apt to be very hard, as there is a great amount of scar tissue and it is difficult at times to free the ureter. In all these operations the transplantation should be done with care as the chances of success are based on the first throw. Should the first operation be unsuccessful a subsequent one is more difficult on account of a shortened ureter. It is necessary to preserve the peri-ureteral tissues to insure proper ureteral nutrition. Another point is that the operation should be done early after the injury. If you wait several months you have a contraction near the end of the ureter, dilatation of the ureter and pelvis with pressure atrophy. When you implant into the bladder the ureter of a dead kidney you have preserved nothing of value to the patient and such a kidney will act only as a source of infection and keep up the bladder inflammation."

DR. R. T. FRANK.—"I have never personally done a ureter implantation, but I have had the opportunity of watching Dr. Brettauer do about six, probably eight, and I assisted him at several of these operations. I always considered it a very easy operation.

"There are only two or three points which I wish to bring out. One is that almost invariably if the operation is done early there is some contraction at the peripheral end of the duct and that therefore about a quarter of an inch should be sacrificed. In the second place the ureter should be mobilized for at least an inch. In the third place the splitting of the end of the ureter into two flaps is possibly of advantage. In addition, two silk sutures should be passed through the flaps and then drawn out through the urethra by the same method which Dr. Gibson and Dr. Grad described, being attached to the outside of the urethra to take off the tension from the bladder-urethral sutures. These sutures are removed in ten days. Finally, drainage *per vaginam* is, I think, of distinct advantage and in that connection there is one other important point to observe before starting, the vaginal opening should be probed and the probe left *in situ*. This is later utilized, before the four ureteral sutures are placed, in order to draw through a small piece of gauze and this gauze must be drawn through before the ureteral sutures are placed because if it is done afterward they are apt to tear out. With those precautions the operation seems to be very easy and very safe."

DR. FRANK R. OASTLER.—"I think the operation for the implantation of the ureter into the bladder is pretty well determined as discussed to-night, but there are certain cases where we cannot get into the bladder. The question is raised as to the best procedure

to follow in these cases. I have had such to contend with and have had to follow two different procedures. There was one case in which the ureter was cut transversely high up. Here I changed a transverse section into an oblique section and sutured the ends, end to end. The result in that case was a leak. The leak, however, closed in time without further trouble. Later on I did a cystoscopy and passed a catheter up and found that this ureter blocked; in other words, the closure had resulted in an obliteration of that portion of the ureter. The kidney gave no further trouble and the woman is perfectly well to-day.

In a second case I did that same operation, making oblique incisions and bringing the two ends together. That healed and apparently without a stricture. There have possibly been two or three other cases which I have seen in the last few years where there had been a urinary fistula but these eventually closed with apparent atrophy of the kidney. Last week I had to operate on what I thought was a papillomatous cyst of the ovary involving almost all the abdominal contents. It had to be separated from everything and I accidentally cut the right ureter high up. As I could not do any specified operation I simply stripped up the peritoneum, worked up underneath it and removed the kidney from the abdomen. The question I want to raise is this: In these cases, where it is very doubtful if we can do a successful plastic operation on the ureter, are we not warranted in simply tying off the ureter, trusting to nature that the kidney will after creating a disturbance possibly for a day or two practically cease to functionate and thereby save the patient from a secondary operation of nephrectomy? I would like to have the opinions of the gentlemen as to whether it is not better to let the kidney alone and allow it to take care of itself and whether we can or cannot do satisfactory plastic operations on these cases."

DR. HOWARD C. TAYLOR.—"I have had a number of cases in which the ureter had been divided during an operation and I have always implanted the upper end directly into the bladder or have done an anastomosis by the Van Hook method. I have never done an anastomosis as described by Dr. Oastler."

DR. JOHN O. POLAK, said: "I would like to ask Dr. Taylor whether or not there has been any disturbance in kidney function in those cases where there has been leakage."

DR. HOWARD C. TAYLOR in answer to Dr. Polak's question as to whether or not there was kidney disturbance in the cases operated upon where there was leakage, said that in one case a uretero-vaginal fistula formed which was followed by an infection of the kidney which necessitated its removal."

DR. ROBERT T. FRANK.—"I would like to add a word and that is the report of such an operation is incomplete unless the result of chromocystoscopy is reported after two or three months have passed. Unless this precaution is observed an obliterated ureter may be overlooked."

DR. GIBSON, in closing the discussion said: "I have nothing to add except that Dr. Grad spoke about putting the ureter high in

the bladder. That is all right if you can find the peritoneum to cover over with. Put it as high as you can, of course, if you can cover it, but it seems to me that the important point is the less tension you get the better, and unless you can cover it with peritoneum there may be danger of a loop of intestine being caught under the ureter. It is very necessary that great care should be taken of the ureter. As Dr. Furniss says, if you strip it off and do not leave enough periureteral tissue it is going to give you trouble. So far as drainage is concerned, I think it is a very good thing to do without drainage if you possibly can. There is danger in putting gauze against the periureteral tissue. Personally I do not see why you should drain at all if your hemostasis is good."

DR. ALBERT M. JUDD reported a case of

#### UTERUS BICORNUS UNICOLLIS.

A. C., married, twenty years old, Russian. Admitted to my service at the Jewish Hospital May 20, 1914 with the following history: Married one and one-half years, curettage seven months before admission, for genital hemorrhage, another curettage five days before admission for the same condition. Causative factor for both supposed to have been incomplete abortion. Always a regular menstrual history, twenty-eight-day type, flows five days, moderate in amount. Last period two weeks overdue, then started to bleed profusely, five days after was curetted, bleeding continued with passage of blood clots, admitted to the hospital with profuse vaginal bleeding and lower abdominal pain.

*Examination.*—Cervix soft, not dilated, erosions around external os, uterus size of a two months' pregnancy, normal position, freely movable, although peritoneal surface of uterus feels regular there is a suspicion of a mass the size of a bantam's egg of harder consistency than remainder of body in right side of uterus just below cornua. Cureting the uterus shows an elevation into the cavity at the middle of the fundus, right cornua deeper than left, possible uterus bicornate. Curetings showed (microscopically) decidual tissue, no evidence of chorioepithelioma. Patient in bed for one week no vaginal bleeding. Vaginal examination showed evidence of a hard mass in right cornua of uterus, diagnosed as fibroid uterus (exploratory laparotomy advised with possible myomectomy so as to prevent future miscarriages). May 30, 1914, exploratory laparotomy.

Operative findings showed a bicornuate uterus, both appendages normal. Appendix removed, abdomen closed. Patient discharged June 12, 1914, primary union in the abdominal wound, no vaginal bleeding, uterus not tender, freely movable.

Readmitted to my service Jan. 2, 1915 with following history: Felt perfectly well for two months after leaving the hospital, then complained of backache and premenstrual pain, had last menses Nov. 4, 1914 skipped December period considered herself pregnant. On Dec. 20, 1914 (two weeks overdue) began to bleed, at the same



time had very severe cramp-like pains in the left thigh radiating upward to left lumbar and hypochondriac region, pains very severe lasting for hours, chilly feeling accompanying pain but no feeling of faintness or fainting spells.

Vaginal examination: introitus normal, dark reddish vaginal discharge. Cervix pointing downward and back. Fundus and body size of a two months' pregnancy, not soft as a pregnant uterus, distinct mass in right cornua harder than rest of uterus, enlargement same as when patient was previously in hospital, left and right ureter palpable, adnexæ not mapped out. Blood count: red cells, 3,600,000; hemoglobin, 68 per cent.

Operation Jan. 12, 1915 by my associate Dr. Bonner under my direction. Cureting showed microscopically; no histological evidence of pregnancy. Exploratory laparotomy. Operative findings, no adherent omentum from previous operations, uterus found bicornuate, left ectopic pregnancy, the distended tube being adherent to the posterior surface of the uterus. Right tube normal. Right ovary fixed low in culdesac by fine adhesions. Adhesions of right ovary separated, left salpingectomy (resection of tube from cornua). Triangular wedge removed from depression between both cornua of bicornuate uterus, down to cervicouterine junction, raw surface (muscular and peritoneal) brought together with plain gut sutures (similar to method used in Cesarean section), ordinary two-point suspension, abdomen closed in layers.

*Examination on Discharge.*—Primary union of abdominal wound. The width of the uterus has been appreciably diminished in size, in normal position, freely movable. Right tube and ovary not palpable. Slight exudate, not tender, at top of left broad ligament.

Feb. 8, 1915. Patient presented herself at my office complaining of sticking pains in lower abdomen. Abdomen normal except for scar. Vaginal examination: body of uterus appreciably narrowed, normal position, freely movable, not tender.

Mar. 3, 1915. Feeling good except for occasional cramps in abdomen and lack of appetite, last period Feb. 20, 1915, five days moderate flow, slight pain first day of flow. Vaginal examination: uterus normal position, freely movable, shape and size of a normal uterus, fornices free, no tenderness.

Nov. 1, 1915. Regular from time of last visit, three days flow no pain until Sept. period, then cramp-like pains first and second day. Should have menstruated Oct. 22, 1915, but skipped this date, last flow was Sept. 24, 1915. The October time of period when flow should have appeared had cramp-like pains in right lower abdomen, has morning nausea.

Vaginal examination: slight duskiness of cervix, no perceptible enlargement or softening, normal position of uterus.

Nov. 24, 1915. No doubt of pregnancy, easy size of a two months' pregnant uterus. Softening in anterior wall of uterus present. (Ladinsky's sign.)

Dec. 31, 1915. Feeling good, no bleeding, has cramps at times in

abdomen and legs (the last of every month). Enlargement and softening of uterus, is more to right than to the left.

Feb. 23, 1916. About four weeks ago first felt life.

Fetal heart heard to the left very distinct, 150.

May 8, 1916, Fetal heart 132, to the left just below umbilicus, hard to get and retain sound on account of placental souffle and distance from stethoscope, evidently a posterior position.

June 5, 1916. Had irregular cramp-like pains since May 22, 1916, feet and legs swollen. Fetal heart to right near umbilicus and below. Head sunk low in pelvis. Urine normal.

July 3, 1916. Patient admitted to my service in labor, having pains which started about 11 P. M. Membranes unruptured. Pelvic measurements normal. Examination: patient in labor, uterine contractions present, vertex position, head low in pelvis, fetal heart present lower right quadrant, no vaginal examination made.

Prepared for Cesarean section at 6 A. M. Abdomen opened, omentum found adherent to uterine scar, classical Cesarean section. Scar in uterus cut with difficulty, of such firm consistency that the patient would without a doubt have delivered per vaginam. The indication for Cesarean section was a fear of uterine rupture. Post-partum convalescence normal.

Examination on discharge July 19, 1916. Primary union of abdominal wound. Vaginal examination: normal introitus, uterus involuting, freely movable, not tender, no infiltration or tenderness in fornices. Baby in normal condition on discharge.

The case presented comes under the classification of uterus bicornus unicollis. It was an extreme type, the body of the uterus being double, with a fused cervix, the external surface of the uterus being saddle shaped. It is a well-known fact that these uterine developmental anomalies become pregnant and deliver normally. This particular case for some reflex reason unknown to the author would not hold a pregnancy but threw it off early and the only prospect of success lay in a removal of the probable reflex causative abortive factor, the partition, by plastic work. The result speaks for itself.

The author, however, feels from the condition of the uterine scar that the Cesarean section was entirely unnecessary and that the patient would have delivered herself normally if left alone. He thus includes himself among these conservative obstetricians who do not believe that once a Cesarean always a Cesarean, for here was a uterine scar extending upon both anterior and posterior surfaces of the uterus from fundus to cervix.

DR. FRANKLIN A. DORMAN.—“I have seen several of these cases go to term and deliver themselves—I mean cases of partition in a saddle-shaped or bicornuate uterus, and in one case I particularly recall a history of one or two miscarriages, yet the woman was normally delivered. The type of labor in most of those cases has been rather defective, the muscular action has been poor and there has been a great deal of discomfort as the patient went through her

pregnancy. With care, these cases can, without surgical interference, carry the child to term. I question the argument that a history of one miscarriage in these cases is sufficient argument to make operation necessary. It seems to me, however, that in Dr. Judd's case it was necessary."

DR. RALPH M. BEACH, said: "Fraenkel reported a case of uterus didelphus in which he excised portions of both uteri, forming a new uterus. The case became pregnant two years later and delivered spontaneously.

"In the case reported by Dr. Judd he made the statement that this operation of his disproved the old saying 'Once a Cesarean always a Cesarean.' I do not think that he can draw such a conclusion, as the scar of an operation on a nonpregnant uterus must be much firmer than one in a full-term pregnant organ."

DR. ALBERT M. JUDD, in closing the discussion, said: "I fully agree with Dr. Dorman, that one miscarriage in a deformed uterus would, of course, not be sufficient argument upon which we might do plastic work, but here was a case, and Dr. Dorman agreed with me, that had evidently had three pregnancies, two intrauterine and one extrauterine.

"Dr. Beach's point is well taken. I presume we can get better coaptation in a uterus of this kind than we can in doing work on our Cesarean sections."

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## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

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*Meeting of October 5, 1916.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

DR. PHILIP F. WILLIAMS and (by invitation) DR. JOHN A. KOLMER, read a paper on

COMPLEMENT-FIXATION IN ABORTIONS IN WOMEN, WITH ESPECIAL  
REFERENCE TO THE BACILLUS ABORTUS (BANG) AND THE  
BACILLUS ABORTIO-EQUINUS.\*

DR. JOHN A. KOLMER.—I can only draw particular attention to a few of the statements made in our paper and brought out by Dr. Williams. I believe it is a well-recognized clinical fact that syphilis plays an important rôle in the production of abortions, particularly repeated abortions. I can only strongly emphasize in this connection the statement made in the paper that when the diagnosis of syphilis among women is based upon the Wassermann reaction it is highly desirable to make the test as delicate as possible. In our

\* See original article page 193.

experience we find that the employment of cholesterinized extracts as antigens fulfils to the best extent the question of delicacy. We feel that this fact should be known and better appreciated. I am under the impression that the gonococcus does not play as prominent a part in the etiology of abortion as the spirochete of syphilis. It has been now pretty well established that where the gonococcus has involved the upper portion of the genital tract, particularly the uterus and tubes, it is very likely that there will be sufficient antibody in the blood to manifest the presence of this infection in the complement-fixation test. I am under the impression that it depends, however, a great deal upon whether or not the tubes are infected. Certainly, in my experience, the highest percentage of positive gonococcus fixation tests are found, first, in gonorrheal arthritis, and second in pyosalpingitis.

The most important part of our paper concerns the possible relationship to abortions among women of two organisms that are known among veterinarians to produce abortion in cattle, particularly in cows and mares. The bacillus infecting the cow is of particular interest to obstetricians, and those of us concerned in human bacteriology, have neglected to give this possible source of infection proper attention. The complement-fixation test is known to be of decided value in the diagnosis of these infections among cows and mares. However, the bacillus abortus (Bang) and the bacillus abortio-equinus are almost totally different. As shown in our paper the organism infecting the cow will give a strong complement-fixation with the antigen of the bacillus abortus, whereas the organism of the infected cow does not react to the same degree with the antigen of the bacillus abortio-equinus. I emphasize this because it is necessary for us who are concerned in human bacteriology, to pay more attention to the possible bacteriology of the placenta in a selected number of cases of abortion. If there is a separate organism introducing the disease into the cow, and another almost totally different in the mare, it is possible that a similar organism not related to those two may be responsible for some of these obscure causes of abortion in the human being. We laid particular stress upon the point that in this particular series of cases we had no serological evidence that these microorganisms were concerned in the abortions. We feel that the complement-fixation test, since it has proved of efficacy in diagnosis of disease among cows and mares, would have indicated the presence of an infection with these bacilli in the human being. This we are justified in assuming, although it has not been proven. The fact that we found no complement-fixation in the abortions of this particular group of fifty women does not exclude the possibility of the organisms infecting women, and I believe it is important for obstetricians to bear this in mind. This is particularly important if there is any possible relationship between the woman's abortion and the infected cow; I mean, whether the woman is a milkmaid or lives on a farm and would come in contact with an infected cow. Further than that, I believe obstetricians are perfectly justified in insisting that our boards of health pay more attention to the milk of aborting

cows and making sure that the milk of these cows is examined bacteriologically before distribution. This is a point worthy of emphasis because bacteriological work has shown that the bacillus abortus (Bang) may be present in human milk and while it has not been positively shown that that organism will infect the human female, the assumption is that it will. In our series of fifty cases we found no evidence of this organism infecting any of these women, but the possibility still remains and should be borne in mind.

DR. EDWARD A. SCHUMANN.—Some five years ago after reading some of the literature concerning the bacillus abortus (Bang) and of an epidemic of abortions in cattle I wondered whether there might be some means by which the toxins of these bacilli might be put to practical use in the induction of labor in women. Before attempting any experiments it seemed reasonable to search the literature, both medical and lay, to see whether there were any authenticated instances of epidemics of abortions in women. I failed to find a single well-authenticated case of any epidemic of human abortions and as experimental work along these lines was unjustifiable, the question was not brought to a conclusion.

DR. E. E. MONTGOMERY.—I do not feel myself competent to discuss a paper on serology. I do wish to express my appreciation of the work that these gentlemen have done, and to say that anything that throws light upon a subject so important as that of the interruption of pregnancy is of immense value. I would be very glad indeed if I could believe that the very large number of cases brought into the Jefferson Hospital for the results of abortion were due to some epidemic condition. I regret, however, to say that the majority are due to efforts upon the part of the individuals themselves to avoid the responsibilities of maternity. Anything that will educate the people concerning the enormity of this sin in its influence upon the community and the public at large is certainly of great value.

DR. JOHN A. MCGLINN.—An important fact to my mind is that the Wassermann reaction is not a safe reliance for the diagnosis of syphilis as the etiological factor in abortions. This has been called to my attention several times. One case in particular was that of a woman who had had repeated abortions who had been examined in Petrograd and in Berlin with negative Wassermann as a result. An examination in Philadelphia was also negative. She became pregnant and another Wassermann at my request was taken in the early pregnancy and this again was negative. Nevertheless I put her upon mercurial innunctions and the woman had her first pregnancy at term. Although there were negative Wassermanns lues was probably the etiological factor in the fetal death. I think, therefore, we should not depend upon the Wassermann reaction as it is ordinarily conducted in determining whether or not syphilis is present.

DR. E. E. MONTGOMERY.—I should like to take exception to the proposition that might be inferred from Dr. McGlinn's statement, that because the tendency to abortion was cured by antisymphilitic remedies the patient was necessarily syphilitic. From a long experience I have found that there is no treatment in individuals suffering

a tendency to repeated abortions more effective than the iodid of potassium if it be continued long enough. I have given iodid of potash in cases in which I have every reason to believe that the patients were not suffering from specific disease and it served as effectively in preventing abortion in such cases as in those in which I knew syphilis did exist. I do not think, therefore, that we should conclude even though a treatment which is specific in its character results in the continuation of pregnancy where such pregnancy had previously been interrupted that the individual is necessarily syphilitic.

DR. WILLIAM R. NICHOLSON.—If the Chair may be permitted, I should like to say that I have been very much interested in the work in my service at the Polyclinic upon this very subject of the serological reactions of the patients coming to the gynecological clinic. I have wondered whether because of the delicacy of the serological test cases might not be diagnosed syphilitic which were not. In instances in which we have given specimens of the same blood to two gentlemen working in these tests we have in certain cases received a positive reaction from one and a negative from the other. I should like, therefore, to have Dr. Williams or Dr. Kolmer explain whether such mistake might not result from the nature of the test.

DR. WILLIAMS, closing.—We purposely omitted mentioning Mohler and Trom's work on the tonsil because we hoped to take up later the question of infection of the uterine contents in aborting women. The one case in which Mohler and Trom found the bacillus abortus (Bang) in the fifty-six cases was the only instance in which the organism was recovered in human tissue. It has been suspected by observers that in this instance it was carried to the tonsil by the child drinking infected milk shortly before operation. In the series reported by Larson of 425 infants and children a number had obscure joint disease much like the white scars of colts. A number of children in the 17 per cent. of positively reacting children had enlarged spleens. That is one of the symptoms of experimentally produced disease in guinea-pigs when infected with cultures of the bacillus abortus (Bang).

There were no febrile cases, the women's general health not being disturbed and we obtained no reactions with the bacillus abortio-equinus. In doing a titration test, with serum of infected cows, however, we did obtain a slight reaction. In the series reported last spring of the Wassermann reactions in several hundred gynecological cases, in the women who had aborted at the time the blood was taken, 20 per cent. gave Wassermann reactions. This corresponds with the percentage of syphilis in the ordinary adult population. In the women with habitual abortions there was 45 per cent. positive reactions. In this series we did not discriminate and had 8 per cent. Lachner of Chicago in a series of 100 abortions reported only 4 per cent. positive Wassermans. I do not believe that the repeated abortions are so much due to syphilis in women as to endometrial changes due to lack of curettage or some residual reaction from the pregnancy in which the abortion occurs which has a deleterious

effect upon the endometrium. We undertook this study from the serological standpoint to see whether there was any evidence of infection by these bacilli through the agency of milk which contains the bacillus abortus (Bang).

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## TRANSACTIONS OF THE MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

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*Stated Meeting, Held October 23, 1916.*

*The President, DR. FREDERIC E. SONDERN, in the Chair.*

### THE TREATMENT OF CONTRACTED PELVES WITH SPECIAL REFERENCE TO PUBIOTOMY.\*

DR. A. J. RONGY read this paper.

#### DISCUSSION.

DR. GEORGE L. BRODHEAD said: Dr. Rongy has brought up many interesting points and it is impossible to take up more than a very few of them. Dr. Rongy said there is practically no danger in the induction of labor and while I think the procedure is comparatively free from danger, we may get a prolapsed cord or malpresentation. Craniotomy is a comparatively safe procedure so far as the mother is concerned, but has been abandoned in cases in which the child is viable and in good condition. By a careful examination we can determine the size of the child quite accurately, but in fat women or where there is hydramnios, this cannot as a rule be done. It is undoubtedly true that some women do go beyond the normal period of gestation and in these patients the advisability of inducing labor should be considered. We do not induce labor now as often as we did ten years ago. We have found that with proper diet the patient may be able to go to term, but in some instances labor must be induced at the eighth month. I cannot agree with Dr. Rongy that labor should always be induced when the patient apparently goes ten days beyond term. The question is simply one of relative proportion between the head and the pelvis. I have a patient who was estimated for the first week in September and is still undelivered. She has a small child and I will not induce labor until there is some indication of a disproportion between the fetal head and the pelvis. In border-line cases we cannot tell what the outcome may be. The high forceps operation is a dangerous procedure, especially in primiparæ, and must be undertaken with a great deal of caution. Craniotomy should not be considered, if the child is in good condition,

\* For original article see p. 208.

and one hesitates to do a Cesarean section in possibly infected cases. If rectal examinations were made, in these border-line cases, we would be in a position where, if it became necessary, we could perform the classical Cesarean section.

Dr. Rongy is to be congratulated upon the results in his series of cases, and indeed his figures are in accord with those of Williams of Baltimore, but personally I feel that taking into consideration both the morbidity and mortality, to mother and child, we will get better results with the extraperitoneal Cesarean section than with pubiotomy, but at the present time, we are not in a position to state with authority which of the two operations should be performed.

DR. GEORGE W. KOSMAK said: I have been very much interested in Dr. Rongy's paper as I have done a pubiotomy in four cases, the last three years ago. Since that time I have not seen a case that offered the proper indications for this operation. In three of these cases we obtained living children. The fourth case was operated upon after the application of forceps and in this case there was a submucous rupture of the sphincter ani. This was not discovered until the woman got up and found she had no control over her bowel movements. These patients, with the exception of the last, all made fair recoveries and went home with their babies in good condition.

One of the great problems in obstetrics is the border-line case in which the proper diagnosis has not been made or there has been a lack of judgment on the part of the physician. In these cases the women were formerly allowed to go into labor and to do the best they could. If the patient could not be delivered craniotomy was resorted to, but fortunately, that time is past.

I am glad Dr. Rongy has preserved a conservative view with reference to the scope of pubiotomy. It is a procedure that should not be undertaken unless the proper means are at hand for carrying it out in a correct manner, that is unless the patient is in a hospital where the operator can have trained assistants. It is a good thing to wait until the head has engaged. It was in a case of this kind in which the head had not engaged, that I lost the baby. The head had only partly come through but was not well engaged.

As to permanent enlargement of the anterior-posterior diameter of the pelvis as a result of pubiotomy, I have made repeated examinations after this operation and they failed to show any increase in this diameter. I have also found that a bony union may take place. We made an x-ray photograph two years after operation in one case where undoubtedly a bony union resulted.

I have come to feel that the vaginal examination plays a small part in infection and have seen Cesarean section cases where no vaginal examination had been made and the women became septic. I do not believe the infections are due altogether to the vaginal examinations. If the infecting organisms are in the vagina then we probably get infection. I do not believe that we can rely entirely on a rectal examination made with the gloved hand, for we cannot be certain of feeling the conditions as they really are.

DR. RALPH WALDO said: A few years ago this operation was quite



popular and a number of men performed it very frequently. I was very much interested in Dr. Rongy's paper because it brought out clearly the indications for pubiotomy. It is indicated for the emergency type of patients and is not an operation of preference. When the head has engaged and there is apparently a slight disproportion between the head of the child and the maternal parts it may be advisable to resort to pubiotomy. It has been my misfortune to see several cases in which the indications for pubiotomy were not followed with the result that there was a great deal of damage to the soft parts. The worst vesicovaginal fistula I ever saw followed such an operation. Pubiotomy seems to me to be indicated in a very small percentage of cases.

DR. A. J. RONGY, closing the discussion, said: I did not come here to advocate any single method of delivery, I only attempted to show how better results may be obtained in cases of labor if they are properly watched and if indications and contraindications for a given procedure are carefully studied. I wish to bring to the notice of the medical profession that if a woman is carefully observed from the thirty-sixth week of pregnancy, to the end of labor, that many radical operative procedures will be avoided. It does not seem reasonable and fair to the average pregnant woman to neglect her during the most delicate period of her life. The usual practice followed by a great number of physicians to examine the patient once at the time when she calls on the doctor to make arrangements for her delivery cannot be too strongly condemned.

In reference to the question raised by Dr. Kosmak, I wish to say that in our cases we had no permanent enlargement of the pelvis after this operation and that the union was fibrous in two-thirds of cases.

I do not wish to be misunderstood on the question of induction of labor. I do not perform it unless signs of disproportion of fetal head and pelvis begin to appear. Induction of labor can be used as a prophylactic measure after the thirty-sixth week of pregnancy only, otherwise the life of the child is endangered.

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## REVIEWS.

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**THE SEX COMPLEX.** A Study of the Relationship of the Internal Secretions to the Female Characteristics and Functions, in Health and Disease. By W. BLAIR BELL, B. S., M. D. Lond.; Examiner in Gynecology and Obstetrics to the University of Belfast, and to the Royal College of Surgeons, England; Hunterian Professor, Royal College of Surgeons, England; Gynecological Surgeon to the Royal Infirmary, Liverpool; sometimes Arris and Gale Lecturer, Royal College of Surgeons, England; and Examiner to the University of Durham. New York: William Wood & Co., 1916. Demy 8vo. 7 Colored and 43 Plain Illustrations. Price \$4.00 net. Dr. Bell's work must be welcomed as one of the rare contributions

in the English language to the literature of this most important and interesting phase of the study of women, which merits the attention of the American medical profession for its clear and dignified presentation of the subject and its wealth of material. There are so many valuable facts presented that it is difficult to refer to them in detail. The book is based on several of the author's lectures delivered some years ago. In one of these lectures the first definite attempt was made to demonstrate that the reproductive functions are directed and controlled by all the organs of internal secretion acting in conjunction rather than by the gonads alone as formerly taught. Dr. Bell believes that this is not an accidental association but rather that it indicates the existence of a definite genital system in which probably all the internal secretions play a part. The subject is one of great importance to physiology and to practical gynecology and this has animated the writer to bring out the results of his studies in book form so that further interest may be stimulated. Unfortunately the outbreak of the war prevented the completion of the work, for it had been planned that the relations of the parathyroid, pineal and thymus glands to the genital system would also be investigated and it is to be hoped that the work will be undertaken at some future time under the author's able guidance. The book must be read from cover to cover to be fully appreciated and every gynecologist should be urged to read the same. The relation of various psychological characteristics in women through the reproductive functions are most entertainingly presented and the possible influence of glandular disturbances invites the earnest attention of investigators.

Dr. Bell discusses in the first part of his book the morphological, physiological and psychological considerations, and in the second part takes up the pathological phases of the subject. The material in this field of research has increased and very noticeably during recent years and a great deal of information is at hand which still needs to be correlated. Dr. Bell might well have extended the size of his book and considered somewhat more completely certain chapters in this field, which particularly toward the close gives one the impression of superficiality and incompleteness.

The book should be given earnest and thoughtful attention by the profession and we hope that in future editions Dr. Bell's presentation of this interesting subject may be further elaborated and extended.

**A MANUAL OF SURGICAL ANATOMY.** By LEWIS BEESLY, F. R. C. S., Edinburgh. Assistant Surgeon, Chalmers' Hospital, Edinburgh; Lecturer on Surgery, Edinburgh School of Medicine for Women; Examiner in Anatomy, Royal College of Surgeons, Edinburgh, and T. B. Johnston, M. B., Ch. B., Lecturer and demonstrator of Anatomy, University College, London; lately lecturer and demonstrator of anatomy, Edinburgh University. New York: William Wood & Company, 1916. Price \$3.75 net.

This book is founded on a series of lectures on surgical anatomy delivered by the authors in connection with the Edinburgh Post-Graduate Courses. They found that senior students and gradu-

ates when working in the dissecting room seemed to prefer books on regional anatomy and while they assimilated the anatomical facts they frequently failed to appreciate their surgical application. In the belief that surgical anatomy should be studied from dissections, the authors have endeavored to present their subject in a form suitable for use in the dissecting room. The anatomy of operative surgery is thoroughly considered, the details of surgical technic being omitted. The descriptions of amputations of limbs have been omitted for lack of space. Special attention has been given to the anatomical relations of the diaphyses and epiphyses to the capsules and synovial reflections because of the frequency with which tuberculous disease starts in and spreads from the same. The book is well printed and satisfactorily illustrated.

**A MANUAL OF GYNECOLOGY AND PELVIC SURGERY.** By ROLAND E. SKEEL, A. M., M. D., M. D. Associate Clinical Professor of Gynecology, Medical School of Western Reserve University; Visiting Surgeon and Gynecologist to St. Luke's Hospital, Cleveland; Fellow of American Association of Obstetricians and Gynecologists; Fellow of American College of Surgeons. With 289 illustrations. Philadelphia: P. Blakiston's Son & Co. Price \$3.00 net.

Dr. Skeel's book is a very satisfactory and valuable addition to the text-book literature, in which the author has properly regarded gynecology as a highly specialized branch of general surgery which demands a thorough knowledge of medicine for a proper appreciation of its relative importance in the medical field. The book is very satisfactorily printed and illustrated and will undoubtedly meet with a favorable reception.

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## BRIEF OF CURRENT LITERATURE.

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### OBSTETRICS.

**Resection of the Sacral Promontory in Flat Pelves.**—Seitz (*Zentralbl. f. Gynäk.*, March 4, 1916) reports a series of ten cases in which the procedure recommended by Rotter and Schmid was employed. Seitz's cases were done in the Frauenklinik at Erlangen with particular reference to the later postoperative condition. These women were delivered by Cesarean section through the lower uterine segment and after suturing the uterus the sacral promontory was resected. In two of the cases death resulted from a general peritonitis and the author is inclined to attribute the infection to the prolonged operation and increased handling of the abdominal contents. It was possible to examine six of the living patients after intervals of from one and one-half to two years, and in only one case was any well-marked elongation of the true conjugate present, the latter amounted to only 0.5 cm. and in the remainder no change could be determined. The

author is inclined to attribute the lack of enlargement of the true conjugate in these cases to the presence of callus formation over the site of operation. The prognosis for subsequent spontaneous labors is consequently not any more favorable. Although the operation in itself is not difficult it complicates a Cesarean and requires eventration of the uterus, the hemorrhage is also severe at times and may require tamponade. The prognosis of a Cesarean section is consequently more unfavorable in these cases and the author is inclined to believe that the operation is not worth while in the majority of cases.

**Intravenous Injections of Colloidal Metals in Puerperal Infections.**—R. Willette (*Jour. de méd. de Paris*, Aug., 1916) from his experience in the treatment of puerperal infection with intravenous injections of colloidal metals, concludes that it renders good service. These cases should be divided into two groups: Aerobic infections, generally by streptococci, which are most frequent and in which colloidal metals are useful, and anaerobic infections and mixed infections amenable to oxidizing or mixed treatment. If we wish to get good results we must not hesitate to use large doses intravenously, not fearing the reaction which takes place in favorable cases. Statistics show that by this treatment in severe cases mortality is lessened, duration is reduced, and complications are less frequent. Action of the colloids is explained by the rapid modification of humoral conditions through the entrance into the general circulation of the metals with their peculiar physical properties. The fall of temperature, leukopenia, followed by leukocytosis, the improvement of the general condition, and increase in the amount of urine, form a syndrome which recalls the crisis, or a series of slight crises preceding a greater one. The use of this treatment neither prevents nor interferes with any other treatment of these cases.

# DEPARTMENT OF PEDIATRICS.

## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

### SECTION ON PEDIATRICS.

*Meeting of December 15, 1916.*

ROYAL STORRS HAYNES, M. D., *in the Chair.*

DR. MARK S. REUBEN reported a case of

#### TUBERCULOSIS FROM RITUAL CIRCUMCISION.

This patient came to our notice at the Vanderbilt Clinic on November 11, 1916, when he was nine weeks old. He had been circumcised on the eighth day by a mohel who aspirated the wound by means of a glass tube. Within a week the entire wound of the circumcision had healed. Five weeks after the circumcision had been performed the mother noticed a swelling in the right groin and it was for treatment of this swelling that the infant was brought to the clinic. The same mohel who circumcised the patient had circumcised two other boys in the same family; these are respectively seven and five years of age and are both well.

Physical examination of the patient was entirely negative; the spleen was not enlarged; the lungs were negative. The inguinal glands on the right side were enlarged, the whole mass being about the size of the little finger. There was also swelling of the left inguinal glands but not to the same extent as on the right side. Examination of the penis on casual observation, presented nothing abnormal; the circumcision wound had completely healed; there was no ulceration. On closer inspection we could see four small tubercular masses, each one separate and distinct and about one-eighth of an inch in diameter, on the anterior surface of the circumcision scar; the frenum was entirely free of any infiltration. On palpation of these little masses, not unlike that of buckshot under the skin, they felt hard and indurated. We excised the largest of these masses and microscopical examination by Dr. Wilensky showed that the tissue was infiltrated with numerous tubercles and diffuse tuberculous inflammatory tissue. The von Pirquet reaction of the infant was positive. Examination of the mohel showed that he was suffering from advanced tuberculosis and his sputum was loaded with tubercle bacilli. In the two weeks after we had first seen the infant it had gained about one pound in weight (10 pounds 11 ounces to 11 pounds, 9 ounces) and never had any fever. Excision of the tu-

berculous tissue of the penis and the inguinal glands on both sides was advised and will soon be carried out. Tuberculides of the skin were never present though they were looked for.

In the literature there are reported forty-two cases of tuberculous infection following ritual circumcision; of these twelve recovered and sixteen died, and of fourteen the results are not known. The most common cause of death in these cases is tuberculous meningitis or general miliary tuberculosis; those that die usually do so in from six to twelve months after the infection. The most rapid course was observed in a case of Holt's, in which the child died three and one-half months after infection. Those that recover invariably show other tuberculous manifestations in later life.

The course of the disease may be described as follows: From fourteen days after circumcision, the wound, which in the majority of cases does not heal, ulcerates and begins to discharge pus; from two and one-half to eight weeks after the circumcision the inguinal glands become enlarged on one side usually more than on the other. In the majority of cases these glands suppurate and break down. The majority of these infants die in from three and one-half months to three years after infection, from tuberculous meningitis or general miliary tuberculosis. Those that recover invariably present other manifestations of tuberculosis in later life (tuberculosis of bones, glands, cold abscesses). The treatment of these cases is early excision of the tuberculous tissue of the penis and the inguinal glands on both sides.

DR. ABRAHAM JACOBI read a paper on

#### THE HISTORY OF PEDIATRICS IN NEW YORK CITY.

In 1901 I read before the New York Academy of Medicine the "History of American Pediatrics before 1800." We New Yorkers have a great deal of self-sufficiency. We think a great deal of ourselves and our ailments, though we are mostly aliens or their offspring. Our big epidemic of measles reached us in 1778 by way of Salem and New England. Bad attacks followed in 1788, 1790, 1795 and 1796 and spread over the United States. Noah Webster in 1799 was convinced that catarrh, measles, variola and whooping cough were but varieties of the same disease occasioned by modifications of the same elementary causes. These elementary causes were draughts, earthquakes, eruptions, meteors, comets and destructive invasions of caterpillars. The popular opinion that measles and smallpox never originate in the human system without contagion is according to Webster a "palpable absurdity." The first cases of most diseases in every epidemic period are always generated in the human body without contagion. That was the epidemiology of the end of the Eighteenth Century.

Diphtheria was first observed in 1736 and is described in Wickes History of Medicine. Samuel Bard has written a brilliant little book entitled "An Inquiry into the Nature, Cause and Cure of the Angina Suffocation or Throat Distemper," as it is commonly called by the

inhabitants of the city and the colony. Dr. Peter Middleton also wrote on diphtheria in 1852. In writing on the same subject, Dr. Richard Bailey said: "Some cases require common antiphylogistic treatment, bad cases demand jugular venesection, tartar emetic and other evacuants, with a large blister." Horace Green in 1840 published cases of laryngeal and bronchial diseases, which he declared to have been treated by intratracheal applications. In 1846 a book which he published on diseases of the air passages, in which the same statement was made, was savagely attacked and much controversy followed.

Beck published a small book on Infant Therapeutics in 1848, in which the chief remedy prescribed was calomel, calomel always and at all times. Dr. John Watson in 1853 first suggested the establishing of a specialty for the surgical treatment of children. Dr. Lewis Smith occupied a prominent place in American Pediatrics as a writer, a teacher and a philanthropist. His observations were nearly always correct. In 1858 he published an article on "Eleven Autopsies of Cholera Infantum cases." In 1861 he joined the New Bellevue Hospital College as Clinical Professor of Diseases of Children, and he died in harness. He was for many years interested in the Randall's Island Hospital for Infants and Children and in the Ward's Island idiots. The great disadvantage under which he labored was that Eberth, Loeffler and Behring had not then existed. Another name that stands high not only in American Pediatrics but in the entire world is that of Dr. O'Dwyer, with whose work on intubation you are all familiar.

I myself was fortunate in being connected with the history of Pediatrics in New York. In 1856, I had a patient who suffered badly from syphilophobia. He insisted on having ulcers of the larynx whose existence I denied. He visited me almost daily until I had a mirror made through which I learned to inspect the larynx. At last I told him I could see all of the inner surface of the larynx which was normal. He then believed and I was satisfied, but unfortunately too much so for I put my mirror away never to try to use it again. (Dr. Jacobi exhibited the mirror.) Within a year Garvia invented his laryngoscope and I missed my opportunity to make a great discovery and fame. Dr. Lewis Elsberg, in 1879, did most toward the evolution of the laryngoscope. Dr. James Stewart's text-book published in 1843 taught for the first time in America the specificity of the origin of infectious diseases. In 1859, Dr. E. Noggerath and I published a big book of more than four hundred pages which contained a few original extracts and referred to the literature of 1858 under the title of "Contributions to Midwifery and the Diseases of Women and Children." This book was very favorably received. I then published twelve articles in the Medical Times which were collected and published under the title of "Dentition and Its Derangements" by which I convinced myself and I hope many others that dentition itself is no reason for disease.

The New York Medical College was founded in 1850 and reorganized in 1860 with a full professorship of Diseases of Children to

which I was appointed. This was the first full professorship of Pediatrics in the United States, and with it came the recognition of pediatry as a subject of coördinate title in medical teaching. In 1861 Bellevue Hospital Medical College was founded with J. Lewis Smith as Clinical Professor of Diseases of Children. In 1865 I transferred my work to the University Medical College, and in 1870 to the College of Physicians and Surgeons. In both of these institutions the title was clinical professor and I was satisfied with it, and the possibility of doing work such as I liked and to be useful. Titles did not influence me much.

In 1860, I took a place in the Nursery and Child's Hospital, where I made a good many autopsies, too many, and proved a mortality of 100 per cent. As a result I lost the place. The first bedside instructor in Pediatrics in New York was given in 1862, at the German Hospital, where we have since been able to establish through the far-sighted wisdom and generosity of Mrs. Wierschoffe the Jacobi Children's Ward. The history of Pediatrics in New York would not be complete did I not refer to the work of Dr. Holt and also to Dr. Goodman's recent work on the serum treatment of chorea.

There are several subjects upon which I would like to speak to you but as my time is short I will consider only one and that is pneumonia.

In my own mistakes and my results I could not help participating in the practice of pediatry and the rest. The vast majority of infant deaths, by the thousands annually, occurred in the first year or two; respiratory diseases attacked more in the second and third years. According to Dr. Holt's statistics, during the last year respiratory diseases have been very prominent and thousands of pneumonias have died at that time and the vast mortality has been and still is taken as self understood. Two weeks ago some learned men read papers and more discussed the subject. I cannot say that I was most pleased. For Dr. Cole has not yet given us the serum that will cure pneumonia. I have been over the ground more than sixty years and I believe American Pediatrics has been and can be more successful than we have been told on the Academy floor. American Pediatrics has been more successful and therapy shows better results than the large audience of which you and I made a part were told. When I left I regretted that I did not communicate the greater success I have participated in for scores of years. Your 20 and 30 per cent. of pneumonia mortalities are quite bad; my 4 per cent. are better. That is what American therapeutics has now come to. A few weeks ago I looked over the records of the Jacobi Division of the German Hospital. Dr. A. L. Goodman and his two adjuncts, Dr. Leopold and Dr. Moffet, have profited by what the experience of scores of years has taught me and them. They availed themselves of no new medication. But they used old medication with greater knowledge and advantage. They have used, like others, digitalis, camphor, caffeine, spartein and sometimes strychnine, but better than others. I rarely treated an adult or a child pneumonia without digitalis and the rest, but American practitioners have gradually stopped to be



cowardly Micawbers. If faintheartedly you wait for changes or chances to turn up you lose your patients. Pneumonias have no stomach for waiting, like an American general in Mexico. In pneumonia some American doctors have learned to know that American children's hearts lose strength from day to day. I repeat that hearts lose strength by the hour. Unless they are stimulated and corroborated at once and persistently in large doses they give out. Small doses are insufficient, big ones are demanded and good articles. Digitalis alone may not be sufficient. Spartein sulphate should accompany it in good doses. The modern American pharmacopeia is no guide for you or your patient. Ignorance of apothecaries has been presiding over it. I read in it that  $\frac{1}{6}$  gr. of spartein sulphate is proclaimed to be the dose for an adult. Very rarely  $\frac{1}{6}$  or  $\frac{1}{4}$  is sufficient as a baby's dose provided you want it to be efficient, and you want it repeated frequently. Caffein is one of the efficient drugs, that means four, or six, or more grains a day for a baby. Camphor has been neglected by us. A year old baby may require 2, or 4, or 8, or 10 grains a day. Urgent cases require the medication under the skin, camphor in four parts of sweet almond oil, not in solutions of ether or alcohol which are painful, and *pain exhausts*. Sodio-caffein-benzoate or salicylate in two parts of water, 4, 10, or 15 grains a day or more. Small doses are thrown away; big doses save your babies and children. These are grateful and you save them. Have no fear of combining several of them. Strychnine should not be used unless the pulse is very small and tension too low. Alcohol is useless in the very beginning but pleasant after a few days and in sepsis it is urgently required in large doses, as I have urged in sepsis of diphtheria. All of these things do no harm; if you are not afraid of acting properly, no crisis need terrify you. It acts smoothly. Never fear it, but fear the undertaker more.

DR. L. EMMETT HOLT read a paper on

#### THE PROBLEM OF THE CARDIAC CHILD IN NEW YORK.

The late Dr. Huddleston, in whose untimely death a year ago many medical and sociological interests lost an ardent and intelligent worker, early in the winter of 1914-15 organized a committee to consider this question. Several meetings were held and various phases of the problem were discussed. The committee appealed to the Public Health Committee of the Academy of Medicine, whose executive secretary made a survey of the hospitals of the city in which children with cardiac disease were treated. Responses to his questionnaire were received from five institutions having a pediatric service, from which it appeared that during the previous year 212 patients were treated in the wards of these institutions with thirty-six deaths. No reliable reports from out-patient clinics were available.

After Dr. Huddleston's death a group of his former patients and friends collected a fund, the income of which it was decided to devote to the study of the problem of the cardiac child. This

committee has during the past year been collecting data which are of considerable interest. It was evident from the report from hospitals obtained through the committee of the Academy that but a very small proportion of the cardiac cases were treated in hospitals; the committee then turned to the public school records of the Health Department for further information. These records showed that there were registered in the public schools of New York City in 1915, 802,338 pupils and in the parochial schools 136,116; making a total of 928,454. Under the supervision of the Division of Child Hygiene it had been the custom of the Health Department to make routine examinations for physical defects of about one-third of the children in the public schools each year. In 1915 there were 278,174 children who received a complete physical examination. Of this number 1.5 per cent. were found to have some form of organic heart disease. Most of these school examinations have been made with the handicap that the physician has not been allowed to remove the clothing from the chest. To correct the error that might thus be made, single schools had been taken from time to time and a more thorough examination of the chest made with the clothing removed. The results, however, have not differed essentially in the two kinds of examinations. It is the opinion of the Division of Child Hygiene from the data thus obtained that about 2 per cent. of the children in the public schools are suffering from organic heart lesions.

An independent investigation was conducted in 1915 under Dr. Guile in the Bellevue district. There were examined 1333 children from Public Schools Nos. 14 and 116. These examinations were made by two or three different physicians, and the cardiac cases thus discovered were subsequently reexamined by Dr. Guile himself. In this group were found a percentage of 4.5 children with organic cardiac lesion and 1.7 per cent. with functional murmurs. From these findings it would appear that results given of the routine examinations of the Health Department have considerably understated rather than overstated the percentage of cardiac cases in the public school children of New York.

On the basis of only 2 per cent., the total number of cases in public school children would be about 20,000. To this number must be added the cases occurring in children below the school age, those too sick to be included in any of the school examinations, and those in the private schools of the city. From all these considerations, that about 25,000 children in New York are now suffering from organic heart disease would seem to be a very conservative statement. An army of 25,000 children marching up Fifth Avenue would make an impressive spectacle and would visualize for the public the magnitude of the problem of the cardiac child in New York City. It would make a powerful appeal to us who realize how casual is the medical advice which most of these children receive and how entirely inadequate is the care and supervision which they are given in the home.

This problem of the cardiac child has medical, educational and economic aspects, all of them very important. Much interest and

a great deal of well-deserved sympathy has recently been aroused in this community for the unfortunate children who have been crippled as a result of the recent epidemic of infantile paralysis. But it should be remembered that the cardiac child is also a cripple, handicapped like the victim of poliomyelitis, both in his education and in his opportunities for earning a livelihood. Those of us who see every day in the hospitals and out-patient clinics the consequences of the neglect and bad management in the home, in the school and in the street should lose no opportunity to place before the public the needs of this class of patients.

Although a special clinic for adult cardiac cases was organized in Bellevue five years ago under Dr. Guile, this group of patients has received but little particular attention until within the past two years which have seen the formation of a Society for the Study and Prevention of Cardiac Diseases, and the opening of special clinics for cardiacs in the Brooklyn Hospital, Roosevelt, New York, and Post Graduate Hospitals; nearly all of these clinics are less than a year old. A number of others are now being organized. Though organized for adults in several of them children are also received. The first cardiac clinic for children was organized in the Out-patient Department of St. Luke's Hospital last year by Dr. Charles Hendee Smith. This clinic is now continued but Dr. Smith has transferred his interests to the Out-patient Department of Bellevue where he has organized a similar service. These are the only two clinics for cardiac children in New York City.

The problem of the cardiac child, at least in its medical aspects, is essentially an out-patient problem; but very little can be accomplished in its solution by desultory old time dispensary methods. It requires efficient organization with facilities that will make possible continuous observation of the children over prolonged periods, careful examinations, accurately kept records, and the coöperation of an efficient staff of visiting nurses and social workers. Very much is yet to be learned about the management of this class of patients who must live in the tenements of New York, obtain their education in our public schools, and finally either be provided with special vocational training which will enable them to be selfsupporting, or, if this is not furnished, become public charges in our institutions. The Board of Education is also aroused to the importance of this problem and questions of exercise, separate classes, open-air classes and open-window classes are already receiving attention. The philanthropic public knows but little of the needs of the cardiac child. All agencies assisting these children look to the medical profession and the medical profession looks to the pediatricist to decide exactly what had best be done with and for these children, and how it should be done. Certainly there is no more fruitful field for study than the management of the cardiac children of a great city.

DR. WILCOX read a paper on

THE OPEN-AIR TREATMENT OF THE CARDIAC CHILD.

There was small provision made to-day for the country care and fresh-air treatment of the really sick child. This was a pity because that vague classification includes just those children who need such opportunity the most and many of these would produce the most striking and spectacular results if given it. There were 109 institutions in New York City and the neighboring districts offering fresh-air care for children; seventy-five of these did not take sick children but accomplished a most useful work in offering healthful recreation to the poor, and add greatly to the composite health of the city by the individual benefit given. For such institutions, however, the bed-ridden child in need of medical attendance and trained nursing, or the child who was likely to die was not an acceptable candidate. There were twenty-eight institutions that accepted children convalescent from acute diseases, but stipulated that they must be fairly able to take care of themselves. There were only six institutions who gave preference to children sick with serious acute or chronic conditions, and in need of medical treatment and nursing, plus the equally important factor, ideal hygiene and open-air environment. It had been truly and often said that a hospital was no place for a feeding case, once the immediate causes of the digestive derangement had been identified and corrected. This was even more true of children suffering from organic disease of the heart, as their period of treatment was naturally much longer, and the chances of hospitalization correspondingly greater. Every cardiac lesion was potentially serious, but many might be completely arrested and cured if given prolonged and proper care; certain more serious lesions of long standing could be stopped short of complete incapacity only if given every opportunity to conserve the remaining functional capacity. The result of inadequate provision for the proper handling of this class of cases represented much suffering to the individual and expense to the State in their later care, since they were discharged from the wards and returned to their homes and the very conditions which were responsible for their illness in no way fortified against a repetition of their misfortunes. Looked at in this light the effort expended upon them while in the hospital was not an economical one.

The importance of providing better care for our cardiac cases became more apparent as we realized that the chances of success were greater than our previous lack of experience had led us to believe. It is to emphasize this point that the following report is made on the organization, management and results of our country branch.

Four years ago we attempted to make the work of our ward and out-patient department at Bellevue more permanently and economically efficient, by starting at Fairfield, Conn., what we called the Auxiliary to the Children's Service. We established there a small hospital of eighteen beds, in charge of one of our nurses, and visited regularly by members of the attending and house staffs. The

routine medical care as carried out at Bellevue was continued at Fairfield, with the addition of fresh air, sunshine, and unlimited space. After two years experience the home was moved to Rahway, N. J., where a larger plant and better equipment was available. With the exception of last year when the epidemic caused us to close the work was carried on from May until the middle of October. Most important to the success of such a plan of treatment is first, the consecutive activity and constant coöperation of the out-patient department and ward in selecting and preparing for transfer to the home the most suitable material; second, the continuance of the same medical supervision at the home as had obtained before the transfer, and, third, the return to the ward or out-patient service of all cases for observation or care after release from the home, and their further supervision by the visiting nurse of the Social Service Department. The cost of carrying out such work, including all expenses, such as salaries, provisions, clothing, medical supplies, transportation, etc., was on an average of \$1.00 a day per patient. As the cases were almost all bed cases a relatively large amount of help was required. On admission to the hospital a brief physical examination sheet stating the condition of the child accompanied each patient. On arrival the children were weighed, put to bed, and kept there until it was determined just what freedom their cardiac condition would allow. Isolation, rest and nourishment constituted all the treatment given. The qualifications which determined their selection of cases for the branch were that the children should be too sick to be acceptable in the usual, fresh-air home, or preferably so sick that recovery was doubtful, unless some curative factor in addition to general hospital care could be brought to bear on their treatment. There were included in this group marantic infants, cardiac disease, chorea, chronic pulmonary disease, including tuberculosis and late pertussis, anemia and malnutrition. It was soon found impractical to care for the marantic infants in the same wards with the older children.

Up to the present time 191 children suffering from a variety of diseases had been cared for; seventy-seven of these were cardiac cases. The average stay of each child in the home was forty-two days. It was of interest to compare the results obtained in the cardiac cases with those of the children suffering from other conditions which were generally considered more amenable to cure. It was to be remembered that the worst cardiac cases were given the preference; all had myocardial, endocardial, or pericardial lesions, and were, or had recently been, suffering from decompensation of varying degrees. Of the children who came to the hospital seriously incapacitated, 49 per cent. were discharged without any surface evidence of the disease, and able to follow a nearly normal life; 40 per cent. of the cardiac cases were improved in general, but still disabled on their discharge. Of the noncardiac cases 27 per cent. were discharged as practically cured or improved. Of the cardiacs 11 per cent. were discharged unimproved or died, while 9 per cent. of the noncardiacs were discharged unimproved or died. The average gain among the cardiacs

was  $2\frac{1}{2}$  pounds; among the noncardiacs 3 pounds. In other words, our cardiac responded about as readily to as did the average run of disease, and it seemed that this success hinged upon just one easily treatable factor in their condition, and this was anemia, and anemia for its proper treatment demanded sunlight and fresh air.

Dr. Wilcox said their experience with one group of fifteen cardiacs treated during the summer of 1914 was particularly satisfactory and yet fairly illustrative of the whole four year's results. Fifteen children too sick with heart disease to remain on their feet applied for ward treatment in the Spring. They remained in the ward until their condition warranted a transfer to the country. As a result of their country experience they returned to New York in every instance in excellent general condition, showing no outward evidences of circulatory disturbance. They took up their New York life, with its many flights of stairs both at home and at school, too often with insufficient nourishment, and usually under poor hygienic conditions, and at the end of six weeks presented themselves at the dispensary in better condition than the average applicant with whom they mingled.

These facts seem to make it clear that we may expect to do quite as much with the child with a broken down heart as we do with those suffering from ills of a less vital nature, and yet the provision for caring for these children is  $\frac{1}{7}$  that offered to other classes of disease.

DR. ROBERT H. HALSEY made a contribution entitled

THE ELUCIDATION OF SOME ARRHYTHMIAS OF THE HEART IN CHILDREN  
BY MEANS OF THE ELECTROCARDIOGRAPH.

It is well before proceeding to the discussion of the arrhythmias of the heart to recall the physiology of the so-called normal heart. The most distinctive function of heart muscle is rhythmic contraction, and the frequency or rate of contraction varies in different portions. The junction of the auricle and superior vena cava or sinus region has the highest contraction rate, while the rate of contraction of auricular muscle is less frequent, and the inherent rate of the ventricular muscle is least. Contraction of the muscle tissue is accompanied by electrical changes, and heart muscle propagates this electrical change with an accompanying contraction. The rate of conduction of the impulse is slowest in ventricular tissue (about 400 mm. per second); faster in auricular (1000 mm. per second); and travels in the Purkinje fibers at a high rate, probably five times as fast as in the other ventricular muscle. It has lately been shown that the left auricle contracts 0.08 of a second later than the right. Each contraction employs the full power of the muscle fibers, and is followed by a short period of rest called the refractory period. The sinus portion of the heart contracts at a higher rate than the auricle, and while the auricle contracts faster than the ventricle, the rate of sinus usually controls, and because the contraction wave spreads in an orderly and progressive way over the right auricle, left auricle, and then by the auriculo-ventricular bundle into the ventricle, it

is necessary to know that this control and sequence is maintained before we can state that any heart is performing its functions properly.

The contraction frequency of heart muscle, if uninfluenced by outside conditions, is maintained as accurately as a chronometer, but in the body the heart rate is normally under the guidance of the vagus and the sympathetic system, but under pathological conditions one set of chambers may escape from such control. Therefore to know that heart is functioning in a normal manner it is essential to learn about the time and sequence of contraction of chambers, paths of impulse travel, and rate control.

The irregularities of the ventricular rhythm, even with the clinical history and physical examination, does not indicate the origin of the disturbance, and it is essential to know this for it will give the indication for treatment—one type requiring active therapy and another none or the cessation of a too active therapy.

Upon the findings, by comparison of electrocardiographic records, can be based some measure of prognosis and the effects of treatment and the results of functional tests of the conductive system can be recorded in an exact manner. Until very recently all that could be learned of the heart action was learned from the left ventricle and peripheral impulse by auscultation and palpation. The introduction of the polygraph supplied some knowledge of the action of the right auricle, and stimulated a desire for a method by which still more could be known.

The electrocardiograph is the only instrument, which regardless of the physical form of the patient, can tell the position or alteration in cardiac position the preponderance of one chamber over the other; the location of lesions; the source of impulses producing contractions; that control is normal or abnormal; the time and sequence of chamber contraction; the explanation of some physical signs the functional efficiency of the auriculo-ventricular conduction; differentiate between heart rates of varying origin, and record precisely the effect of drugs on the cardiac mechanism.

Dr. Halsey presented records illustrating irregularities of the heart in children under fifteen years of age.

He said: "These records have been obtained from an examination of ninety-two children selected because the irregularity was observed to differ from the common respiratory type. Sinus changes occurred most commonly, and next the premature contractions of the auricle, while premature contractions of ventricular origin were third. No example of auricular flutter was found. Examples of fibrillating auricle returning to normal rhythm were found in three cases, and heart block and premature ventricular systoles induced by digitalis in two cases.

These records demonstrate variations in time of impulse formation; the refractory period; the complimentary pause following premature ventricular contraction; premature auricular contractions; premature ventricular contractions; complete dissociation of auricle and ventricle; heart block with two auricular to one ventricular contraction; retarded conduction or first stage of block and auricular fibrilla-

tion. Without the electrocardiograph this demonstration would have been impossible.

In closing, let me remind you that the occurrence of serious irregularities in children is rare, but these children are so frequently put to bed and the parents given a serious prognosis, as if a disease of the heart were present, that this presentation may serve to cause a further elucidation of such cases before treatment is begun.

#### DISCUSSION.

DR. JAMES.—The hour is so late that I shall keep you only a few minutes and speak only of cardiac irregularities in childhood. The melancholy condition—the prevalence of organic heart disease in children in New York City, which Dr. Holt has so clearly described, is surely a very disquieting state of affairs. But now that the conditions are known and the attention of the public and especially of the medical profession, has been drawn to it, we have every reason to believe that improvement will be brought about.

One of the first good practical points given me when I first began to practise medicine in New York, was from Dr. Jacobi, who has given us to-night such a brilliant history of Pediatrics in America. At a consultation he told me that one of the pleasures of practising among children was the fact that they had every disease singly, while in the adult there was rarely present only one disease at a time. Nowhere is this more strikingly true than in the cardiac diseases of children. The involvement of other organs with complications takes place as a rule, if at all, only at the very end; while in adults and especially in elderly people, from the very commencement we almost never see a disease of the heart without complicating conditions in other organs, conditions which are often a source of much bewilderment and uncertainty. For this reason, both diagnosis and treatment of heart disease in children are much simpler than in adults.

Heart irregularities in children are far more simple and easy to understand than in adults. The fact is, it is extremely rare in childhood to meet with any other than a sinus irregularity, but this irregularity may be so extreme that it may simulate a more serious form and so very often give rise to errors in diagnosis.

I am told that Lewis has seen fibrillation of the auricles and pulsus irregularis perpetuus once in a child of two, and at very long intervals one meets with this condition in children below twelve, but as far as I know it is always in association with well-marked mitral stenosis and very pronounced organic change in the heart, so that its recognition is simple and its significance easy to estimate and its treatment exactly as it would be in the adult. Extrasystoles are fairly often met with in children but here again their interpretation is simple, for you may perfectly safely assume that they are of the auricular variety and you do not need an electrocardiogram; while in the adult the differentiation of the one type of extrasystole from the other can almost never be made out without an electrocardio-



gram. Ventricular extrasystoles almost never occur in children, except from digitalis.

The other types of irregularity such as auricular flutter and pulsus bigeminus, I have never met with in childhood. This leaves us only the sinus irregularities to consider and we may reckon auricular extrasystoles with these, as in childhood they probably have practically the same significance.

Sinus irregularities then comprise almost all of the forms that are met with in infancy and early childhood. They are disturbances of function and have no organic significance whatever; they are to be regarded as normal phenomena and only when they are extreme in degree do they need any consideration whatever, and in these cases only because they indicate an unstable condition of the pace maker or governor of the heart. They suggest then merely that as with any other machine whose governor is not working properly the organ should be used with some care. It is therefore my habit in the case of boys who show this type of irregularity very markedly, to advise against extreme athletic indulgences, assuring the patients that the trouble will inevitably clear up as the boy goes on and grows older.

Many young people are a little slow in developing automatic heart control, just as many of them are backward in developing control of their tempers, the control of their bladders and certain other functions which are only very imperfectly developed very early in life.

Practically, this becomes a very important matter for the profession, for it is very common for physicians to be too much concerned when they discover an irregularity of the heart in a child. Frequently a diagnosis of myocarditis is made and harm is done through unwise restriction of activity and the creation of a state of invalidism.

I think it is perfectly fair to state that in childhood any irregularity of the heart that is not associated with perfectly clearly demonstrable organic disease of the organ should be disregarded and should be considered a temporary peculiarity of function which will disappear with time and which requires no treatment whatever. To this it is perhaps fair to make one exception though it will occur with such infinite infrequency as to make it hardly worth while considering; following one acute infectious disease, there may be a focal myocarditis involving the Bundle of His and producing heart block and so the pathological slowing of the pulse. This can only be positively diagnosed through the electrocardiogram, but in any child who develops a persistent pulse of from 32 to 40 following diphtheria or scarlet fever, it is fair to diagnose this condition.

I leave out of consideration those changes in the pulse which accompany the later stages of a grave, acute infectious disease, such as pneumonia. The character of these changes in children and in adults constitutes a separate chapter. I am referring now only to cases of intrinsic disease of the heart itself.

Modern medical science has carried our knowledge of the diseases of the heart to such a point that we may now hope to accomplish

great good from the prevention of heart disease in children and we may be almost as sanguine as to the ultimate outcome of our efforts looking toward the control and management of children who have already acquired cardiac lesions. To make our knowledge effective we should lay aside as far as possible, differences of opinion and strive for unanimity and agreement as to the best method of attacking the problem. I am confident that as soon as a united profession can offer to the public such a method, all the funds required for carrying out this work will be speedily forthcoming and we shall add one more debt to the many which the community already owes the profession for lessening infant mortality and for improving the quality of the human individual through wise methods of modifying his bringing up.

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## BRIEF OF CURRENT LITERATURE.

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### DISEASES OF CHILDREN.

**Spinal Fluid in Mongolian Idiocy.**—In a previous paper, H. C. Stevens (*Jour. A. M. A.*, 1916, lxvi, 1373) presented results which he claimed indicated, with a high degree of probability, that the condition known as Mongolian idiocy was one of the manifestations of congenital syphilis. That conclusion was based on serologic tests which were made on the blood serum and the spinal fluid of twenty-one Mongolian idiots. In a second series of eighteen cases he now finds that the Wassermann reaction on the blood serum of Mongolian idiots was positive in 33 per cent. of the cases. The Wassermann reaction on the spinal fluid was positive in 11.1 per cent. Pleocytosis was present in no case, except in the two already mentioned in which blood was present. The globulin content was increased in 100 per cent. The gold chlorid reaction was present in 100 per cent. of the cases. The color changes of the gold chlorid reaction were typical of cerebrospinal syphilis. While the serologic tests seem to demonstrate that this condition is a result of syphilitic infection, it is not, however, to be considered a form of frank cerebrospinal syphilis. The characteristic facies of the Mongolian syndrome and the dwarfing of the body make it appear probable that the syphilis acts primarily on some of the endocrine organs, possibly the pituitary body. Studies of the metabolism of groups of Mongolian idiots show a high degree of sugar tolerance and calcium retention.

**Permeability of the Gastroenteric Tract of Infants to Undigested Protein.**—The investigations of O. M. Schloss and T. W. Worthen (*Amer. Jour. Dis. Child.*, 1916, xi, 342) were undertaken in the effort to determine the possibility of absorption of undigested protein by infants. For this purpose precipitin and anaphylactic tests were used and the blood was examined for the presence of reaction substances (protective ferments of Abderhalden). In many of the

experiments of others the tests for foreign protein were applied to the blood. This may seem the ideal method. As applied to infants this method has at least one insurmountable obstacle. It has been shown by Ascoli, Lust and others that the foreign protein is present in the blood stream for a very short time and the detection of its presence would require frequent examinations, a procedure not permissible in infants, especially those affected with nutritional disorders. On the other hand, it has been found that the foreign protein is present in the urine over a longer period of time. As shown by precipitin and anaphylactic tests applied by Schloss and Worthen to the urine, the intestinal tract of normal infants is usually impermeable to undigested foreign protein. In nutritional or gastroenteric disorders, foreign protein may be absorbed in an undigested or partially digested state and appear in the urine. The precipitin reaction, applied to the urine for the detection of egg protein, is apparently more delicate than the anaphylactic test. These results demonstrate the possibility that certain nutritional disorders in artificially fed infants may be due to the biologic character of the food, although they obviously give no direct evidence to support such a view.

**Ethylhydrocuprein in Treatment of Measles, Scarlet Fever and Other Infections.**—A. D. Hirschfelder and F. W. Schlutz (*Amer. Jour. Dis. Child.*, 1916, xi, 361) have made tests on cases of measles and scarlet fever with ethylhydrocuprein. Their observations on scarlet fever gave negative results. In measles, however, the effects seem more promising. Eleven unselected cases were treated and showed an average duration of 4.3 days, while among ten unselected cases occurring under the same circumstances and during the same months of the same year, the average duration was 7.9 days. Moreover, all the treated cases were free from complications, while in the untreated there were six cases of severe complications among sixteen consecutive cases in the Minneapolis City Hospital. This preliminary publication indicates that ethylhydrocuprein is worthy of further trial in the treatment of measles.

**Control of Diphtheria.**—D. M. Lewis (*Jour. A. M. A.*, 1916, lxvi, 1535) says that carriers are of two types, pharyngeal and nasal. The former, constituting less than one-fourth of all carriers, show acute hyperemia superimposed on chronic pharyngeal hypertrophy. The culture result is positive and there is a history of an attack of diphtheria. The nasal type is characteristic. There is a bloody, purulent nasal discharge, usually unilateral, with excoriation of the upper lip and neighboring skin. By these signs one may easily pick out three-fourths of all true carriers. In his first year's campaign in New Haven, Conn., the writer followed the prevalent practice of bacteriological control of contacts and convalescents. In the second year he gave more prominence to field work. No contacts were isolated if the nasopharynx was normal, even though the cultural result were positive. In the same conditions quarantine was raised. Those of the exposed who showed acute pharyngeal hyperemia were isolated and kept under observation. No return cases or develop-

ment of carriers resulted from this procedure. On the other hand, two new infections were traced to a case in which, although the pharynx was yet mildly inflamed, quarantine had been raised on the strength of two successive negative cultures. This person proved to be a pharyngeal carrier. Missed cases and carriers were also sought by a neighborhood survey on the following lines: investigation of all school absentees and all children in school with nasal discharges, their names and addresses being furnished by postal card notification through the schoolteacher. From the data so obtained, in conjunction with those of the neighborhood cases, a card index is made which is of the greatest aid in tracing each future focus of infection. The procedure followed in the first year necessitated the making of 5000 cultures. In the second only a third of that number were made, but the inspections were doubled. Starting in October with a number of reported cases of diphtheria equal to that for the same period of previous years, in December, January and February, for the first time in its history, the city had weeks without a reported case. Other weeks produced half as many cases as the corresponding weeks of the previous year, and only a quarter as many as earlier years. The results of a comparison between the statistics of New Haven and those of neighboring cities and towns for the same period were equally favorable to the former. To secure practically complete control, two further precautionary measures are needful. The first is the recurring inspection, by field nurses, of children under school age in families with no school absentees. The second is the notification, to the board of health, of the arrival of families moving into the city.

**Determination of Alkalinity of the Spinal Fluid.**—The method devised by A. Levinson (*Arch. Pediat.*, 1916, xxxiii, 241) for determining the alkalinity of the spinal fluid is as follows: Measure 20 c.c. of distilled water in each of three Erlenmeyer flasks, 50 c.c. capacity, all the flasks being of the same height and width. Into each flask pour 1 drop of 2 per cent. methyl red. This produces a straw-red color, which is the neutral point. Measure 1 c.c. of the spinal fluid to be examined in a graduated pipette, and pour it into one of the flasks. Titrate this flask with  $n/100$   $H_2SO_4$  until the neutral point is obtained. Compare this with the other two flasks, all three flasks being placed on a porcelain stand. When the neutral point is reached take the reading, and then run in one more drop of the  $H_2SO_4$ . A bright red color appears. In order to check the result add 1 drop of  $n/100$   $NaOH$ , which changes the color of the solution to straw, and another drop, which changes it to yellow, thus proving that the end point has not been overrun. This method gives no difficulty in obtaining a sharp end point.

Using this method in a series of cases, A. Levinson (same, 247) finds that spinal fluid is alkaline normally and remains so even in the most pathologic cases. The alkalinity in nonmeningeal cases varies between 1.5 c.c. to 2.6 c.c. of  $n/100$   $H_2SO_4$ , using methyl red as indicator. The alkalinity is greatly lessened in epidemic meningitis, ranging between 0.7 c.c. and 1.3 c.c. It is seemingly also decreased

in pneumococcic meningitis, while it is not decreased in tuberculous meningitis. This would make the lessened alkalinity of diagnostic importance, in that it would indicate a meningococcic or pneumococcic meningitis. The lessened alkalinity bears no direct relationship to the dextrose of the spinal fluid. Administration of serum increases the alkalinity.

**Acidosis Occurring with Diarrhea.**—According to J. Howland and W. McK. Marriott (*Amer. Jour. Dis. Child.*, 1916, xi, 309) acidosis is found in many cases of severe diarrhea not of the ileocolitis type. The clinical expression of the acidosis is hyperpnea. The presence of the acidosis has been confirmed by determining a lowering of the carbon dioxid tension of the alveolar air, by an increase in the hydrogen ion concentration of the blood serum, by a diminution of the alkali reserve of the serum, by an increase in the amount of alkali required to alter the reaction of the urine (alkali tolerance) and by a diminution of the combining power of the hemoglobin with oxygen. It has been shown that the administration of sodium bicarbonate will often bring about a cessation of the hyperpnea and cause the laboratory tests to give the results that are found with normal infants. The acidosis is not due to the presence of acetone bodies. It has not been demonstrated that it is due to loss of base. It is probable that it is due to deficient excretion of acid phosphate by the kidneys.

**Excretion of Creatinin and of Creatin in Acute Nephritis.**—I. S. Cutter and M. Morse (*Amer. Jour. Dis. Child.*, 1916, xi, 326) present the data derived from a study of two children aged five and thirteen, whose cases were followed for periods of thirty-five days and ten days, respectively. The diets in each case were practically creatin and creatinin-free, being administered for minimum protein maintenance, calculated in calories. In one case the temperature was practically normal except at the beginning of the disease. In the other the chart was not available. The most conspicuous feature of the curves of excretion of both constituents and in both cases is the wide variation from day to day. Moreover, this variation, which approaches a rhythm, is independent of all known concomitant factors, such as food, temperature, etc. It appears that a threshold exists which, on being reached, leads to excretion of the creatin and creatinin. Retention in the sense of almost if not quite total suppression of excretion of these components does not exist for a period of more than twenty-four hours. The curves exhibit no correlation between the behavior of creatinin and that of creatin. It is impossible to determine anything which might suggest an origin of one from the other. There is a wide divergence between the data reported for adults and those determined by the writers for children.

**Creatin Retention in Marasmus.**—I. S. Cutter and M. Morse (*Amer. Jour. Dis. Child.*, 1916, xi, 331) found in the case of a male child of two years, whose curve of growth gradually fell on account of pyloric spasms, that the creatin excretion remained practically suppressed until the growth curve began to rise consequent on breast

feeding. Creatinin excretion remained normal during the whole period.

**Foreign Bodies in the Respiratory Tract.**—N. W. Green and L. T. Le Wald (*Annals Surg.*, 1916, lxiii, 663) say that when the object has found lodgment in the smaller bronchi and there has become fastened with no further displacement, after the initial symptoms of severe cough and varying dyspnea it may give rise to comparatively little disturbance until some of the deferred phenomena have begun to show themselves. An object which remains stationary in the larynx or trachea will probably give rise to more or less constant symptoms, especially those of dyspnea, either from occlusion of the air interchange or due to a continuous reflex inhibition of respiratory movements. If an object has been arrested at the tracheal bifurcation or in the right or left main bronchus, it may be of such proportions that it is neither impacted nor coughed out, but acts as a movable body, which may be blown about by the current of air and find impingement upon different parts of the mucous membrane, each time causing a fresh paroxysm of coughing. Any symptom for which the cause is obscure must, among other things, be considered as possibly due to a foreign body. The presence of a localized bronchitis, a pneumonia which fails properly to resolve, a lung abscess, a bronchiectasis, or a chronic empyema should lead our attention to the possibility of the complication of a foreign body and one should at once proceed to a further means to clear up the diagnosis. All recently aspirated foreign bodies should first be sought by the Röntgen ray and the bronchoscope, without delay, and removed if possible through the mouth. Failing to remove them through the mouth a tracheotomy should be done and another attempt made by means of the bronchoscope. Failing in this the tracheal wound should be held widely open by wires or a large tube in the hope that the foreign body may be coughed out. If immediate removal by these methods fail, a period generally elapses in which the patient may undergo secondary changes in the lung, such as pneumonia, gangrene, abscess and generally an overlying empyema. If the patients recover from these acute infectious processes, they pass into the class of deferred cases with the foreign body still present as an aggravating factor in their chronic lesion. Removal of the foreign body in these deferred cases does not always effect a cure. The lung abscesses must be treated along surgical lines and even then we cannot always hope for a cure, but rather only an amelioration of their affliction.

**Treatment of Intracranial Hemorrhage in the New-born.**—In reporting two cases of this type, R. M. Green (*Bost. Med. and Surg. Jour.*, 1916, clxxiv, 947) says that intracranial hemorrhage in the new-born may be most conveniently classified clinically under two groups—infratentorial and supratentorial. In the infratentorial type of hemorrhage the symptoms and signs are primarily respiratory in character and are probably dependent on the pressure of accumulating blood about the respiratory center in the medulla. In the supratentorial type of hemorrhage the symptoms and signs

are primarily convulsive and are probably dependent on the irritation of the motor area by accumulating blood over the cerebral convexity. In any case of doubt, diagnosis should be confirmed by exploratory lumbar or cranial puncture, or both. In the infratentorial type of hemorrhage repeated lumbar puncture is probably the best palliative treatment and may prove definitely curative. In the supratentorial type of hemorrhage, the best treatment is incision along the coronal suture at one or both lateral angles of the anterior fontanelle followed by brief drainage with rubber tissue. More extensive procedures than that above outlined are unnecessary and likely to prove fatal. Early diagnosis, and operation within the first two or three days of life, are essential for the best results, since, in such cases, the blood still remains fluid and there is prospect of its complete removal by drainage. The prognosis becomes steadily worse as time progresses, since the clotting of a considerable amount of the blood makes such complete removal impossible, and even if the baby recovers, there is much greater likelihood of subsequent adhesions and irritative Jacksonian phenomena.

**Tuberculosis of the Cervical Lymphatics.**—C. N. Dowd's (*Jour. A. M. A.*, 1916, lxvii, 499) paper is based on a study of 687 cases in which operation was performed by himself, his associates or assistants. Enlargement of the upper cervical lymphatics establishes what we may call the early stage of lymphatic neck tuberculosis. Of the 687 patients 452 were observed in this stage. Of these 98 were not observed after leaving the hospital; 91 per cent. of the patients traced were apparently cured when last seen; 8.75 per cent. showed slight evidence of recurrence; 0.25 per cent., that is, one patient, had died of intercurrent disease—typhoid fever; 8 per cent. had secondary operations during the period of observation. Their average age was 8.03 years. For this class of patients the results are eminently satisfactory. It has been suggested that many of these cases had the bovine type of tuberculosis and that this accounts for the good results. Drs. Park and Krumwiede have examined many of these cases to determine this question. Their findings for patients from five to sixteen years showed the bovine type in only 29.6 per cent. If abscesses within the subparotid nodes break and form sinuses, or if the inflammation progresses without abscess formation, the nodes along the entire jugular chain and those along the trapezius border may become enlarged. There were 185 patients in this group. Their average age was 15.9 years, nearly double that of Group 1. Of these, 60 were not observed after leaving the hospital; 68.2 per cent. of the patients traced were apparently cured when last seen; 23.8 per cent. showed recurrences when last seen; 5.5 per cent. had died of intercurrent disease, partly tuberculous; 2.4 per cent., or three patients, died in the hospital, two from hemorrhage, and one from thrombosis; 28.5 per cent. of the traced patients had two or more operations. The results obtained in Group 2 were greatly inferior to those obtained in Group 1. Another division, those with diffuse tuberculosis, show little power of resisting tuberculosis. The neck infection quickly involves a great number of nodes, and

there are usually evidences of tuberculosis in other parts of the body. There were fifty patients in this group. Their average age was 12.7 years; 76 were not observed after leaving the hospital; 1 died in the hospital; 34 per cent. of the patients traced were apparently cured when last seen; 43.2 per cent. were suffering from recurrences or other forms of tuberculosis; 20.4 per cent. had died of intercurrent disease, largely tuberculosis; 1 patient died in the hospital, soon after a minor palliative operation. Treatment of this type of cases is far from satisfactory. If, however, one third of them are apparently cured after long periods of observation, we have some encouragement. On studying these groups of cases it is easy to see why so much confusion exists about this subject. Certain types of cases predominate in individual clinics. Much confusion exists about the term "operation" as applied to these cases. If the incision of an abscess, or the removal of a single node, is called an "operation," we shall have very poor operative results; if the term "operation" means the removal of all the enlarged lymph nodes in the neck, we shall have very good operative results. The most common error comes in those patients who have cold abscesses. These cases regularly have groups of nodes in the usual location beneath the sternomastoid muscle, and unless these nodes are found and removed, the operation is futile. All operations should be done with due regard to the anatomy of the neck, and with careful precautions against nerve injury, particularly avoiding the spinal accessory nerve, and the lowest branch of the facial nerve. Transverse incisions give suitable exposures for the majority of the cases, and have the great advantage of leaving scars which do not stretch, and hence are almost invisible. In the far advanced cases, however, the scar is not the important factor, and longitudinal incisions should be used, since they give easier access to the masses of enlarged nodes.

**Diphtheria in the First Year of Life.**—J. D. Rolleston (*Amer. Jour. Dis. Child.*, 1916, xii, 47) says that diphtheria in the first year of life is comparatively rare. Only twenty patients at this age occurred among a total of 2600 diphtheria patients of all ages. Congenital syphilis is an important predisposing cause. Sixty-five per cent. showed some nasal involvement, with or without other diphtheritic lesions elsewhere, as compared with 25.6 per cent. in the total. Thirty per cent. were purely nasal, as compared with 1.5 per cent. of the total cases. The mortality was high, 45 per cent., as compared with 7.3 per cent. in the total. Paralysis was rare, two cases; bronchopneumonia, six cases, was common. A history of infection was obtained in only three cases.

**Creolin in Scabies in the Infant.**—Scabies in the infant, instead of being confined to the classical situations, as observed in the adult, tends to spread all over the body, limbs and face. Furthermore, at this age, there is a natural inclination to eczema, and an equally marked susceptibility to pyogenic infection, and these call for a non irritating parasiticide. D. W. Montgomery (*Arch. Pediat.*, 1916, xxxiii, 525) recommends for this purpose a mixture of creolin, 1 part; soft soap, 3 parts; benzoinated lard, 7 parts; rubbed in once a day



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MARCH, 1917

EDITORS

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GEORGE W. KOSMAK, M. D.



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**ORIGINAL COMMUNICATIONS.**

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**CONSERVATION OF ENERGY IN SPINAL ANESTHESIA  
WITH PARTICULAR REFERENCE TO ITS VALUE IN  
WEAKNESS OF THE CARDIAC MUSCLE.**

BY

R. R. HUGGINS, M. D., AND B. Z. CASLEMAN, M. D.,  
Pittsburgh, Pa.

For the past few years we have been using spinal anesthesia in selected cases. With improved technic and with increased confidence in our ability to give it safely, its application has been more widely extended. From this experience we have made certain observations which have been of great value. The most important of these is a keen realization of the necessity for the most careful study of the patient before any operative procedure is undertaken. This has led to a better knowledge of the strength of the circulatory apparatus in a given patient and a desire to save not only the strength of the heart muscle but to conserve energy that is expended in other ways in every major operation. We believe that the time has come when men doing surgery to any large extent must realize that the best results can only be obtained by a careful selection of the anesthetic. There is no method which can be made universal. While we realize that a low rate of mortality from spinal anesthesia can only be expected from the greatest care and skill in technic, yet we believe that this added burden to our already heavy responsibilities will result in the saving of many lives that may be otherwise lost.

The relation of exhaustion to shock is well known to all surgeons and the question of conserving the strength of patients has become a matter of great importance in the last few years. Crile has particularly emphasized the exhausting effects of trauma, whether it is

mechanical or psychic, and has developed a technic for conserving as much as possible the nervous energy of the patient who comes for operation. A large percentage of patients who present themselves for operative procedures are handicapped by the exhaustion of a severe or a long-continued illness which has burned up, to a greater or less degree, their reserve supply of strength and energy. This is particularly true of women, very many of whom show evidences of chronic fatigue and exhaustion. That surgical procedures, as ordinarily carried out under general anesthesia, are exhausting is very evident in observing the postoperative course of patients who have had major operations performed. This is well shown in the weakness, the nervousness and the sleeplessness of these patients. The surgeons who see their patients frequently after their discharge from the hospital are familiar with the fact that a laparotomy is not a matter of a week or two in bed and a week or two of convalescence, but that these patients are not up to par for months. Constipation, gas in the intestines, weakness, nervousness, inability to sleep well, and a tendency to tire readily are the evidences of exhaustion that are experienced by many patients for months after operation. These become progressively less and in most instances have disappeared within a year. Operative results should be estimated on the basis of morbidity as well as mortality and the surgeon who neglects the former is falling short of the goal.

That the preoperative, the operative and the postoperative management of surgical cases is of the greatest importance in lowering the mortality in bad surgical risks is generally appreciated, but as the mortality in surgery is low, how much more important is this in the question of postoperative morbidity in the large majority of patients who fail to fall victims of the grim reaper after surgical procedures. Our problem should not be solely how to keep the 1 per cent., 2 per cent. or 4 per cent. from dying, but how we may, in the shortest time, restore the 96 per cent. to 99 per cent. to as good health as possible. In other words, we make a plea for the living rather than the dead.

The vital factors concerned in minimizing shock and exhaustion are the reduction of operative trauma and hemorrhage, and the conservation of the patient's strength. The factors involved in this conservation of energy are the preoperative management and preparation, the anesthesia, and the postoperative care. Preoperative starvation, depletion by purges and withholding of fluids, and the exhaustion as a result of preoperative sleepless nights of anxiety are no longer considered as essential to the experiences of a patient



who is to undergo an operation. Nor is the question of the action of opiates on the intestines or on the patient's opsonic index to be compared to the exhausting effects of postoperative pain, restlessness and loss of sleep on the nervous system and reserve strength of the patient.

The stimulating action of ether in the first half hour of anesthesia is readily observed in the flushed face, the rapid respirations, the increased pulse rate and the hot, moist skin. The appearance is one of activation. In patients who take the anesthetic badly we see, in addition, the suffused cyanotic skin of the face, the engorged veins, the stiff muscles and the forced respirations partly due to increased mucus, laryngeal spasm, or obstruction as a result of falling back of the tongue, so that ether anesthesia produces a condition of activation and stimulation at first, followed later by the exhaustion that is certain to follow long-continued overactivity. In watching these patients over an hour or two of ether anesthesia, we are impressed by the great expenditure of energy. The later stages of prolonged anesthesia are characterized by lowered temperature, absence of the flushed skin of the early stages, the skin may be drenched with perspiration, the respirations are more shallow and less noisy, and the patient shows evidences of exhaustion, the picture of the untrained athlete at the end of a race. These patients look tired and they no longer respond to the stimulating action of ether. How many patients who present themselves for operation are sufficiently supplied with a reserve force of energy to withstand an hour or two of such activation without showing signs of exhaustion? Add to these effects of the anesthetic *per se*, the increased trauma on the part of the surgeon in overcoming the stiff abdominal muscles, the tendency of the patient's increased respiratory movements to extrude the intestines through the incision, the increased amount of hemorrhage as a result of the stimulation, the overventilation of the lungs due to rapid breathing, the loss of fluid from sweating and postoperative vomiting, and we have elements that contribute to shock. These vary directly with the strength of the patient, the manner in which the anesthesia is produced and how the patient responds to the action of the anesthetic, and the duration of anesthesia.

The question of vital resistance involves more than a consideration of the condition of the heart, lungs and kidneys. In order to prevent mortality, we must consider the reserve strength of the patient and estimate how much of this may be utilized without overtaxing the individual. Likewise in order to reduce morbidity

to a minimum, we must adopt measures that conserve as much as possible the strength of the patient. The purpose of this paper is to emphasize the value of spinal anesthesia in this conservation of energy.

In spinal anesthesia the blood pressure falls, the respirations are slow and shallow, the pulse rate is reduced and the heart is working more slowly and against less peripheral resistance, the skin is pale and there is less than the normal loss of fluid, the muscles are completely relaxed and the patient presents the appearance of subactivation. If the patients have received the preliminary medication of morphine and scopolamine such as are generally used, they come to the operating room indifferent or oblivious to what is going to happen and there is a minimum expenditure of nervous energy and a minimum of psychic trauma. Ordinarily with a marked fall of blood pressure there is a marked increase in pulse rate, but in spinal anesthesia, with the fall in blood pressure there is a corresponding reduction in pulse rate, contrary to what might be expected. A patient with the combined *Dämmerschlaf* and spinal anesthesia presents the appearance of one in hypnotic sleep, so that after an operation of one or one and a half hours with all bodily activities subnormal and all traumatic impulses blocked, the patient has expended less energy than under normal conditions. To those who have struggled with pathological conditions deep in the pelvis in fat women who take their ether badly, using retractors to overcome stiff abdominal muscles, and gauze pads to prevent the forcing of the intestines into the field of operation, there is an appreciation of the amount of energy expended by both patient and operator in battling with each other. Contrast with this the flaccid, relaxed abdominal walls the contracted intestines lying quietly in the abdominal cavity and the slow shallow respirations as seen in spinal anesthesia. To those who have used this type of anesthesia, the lessened hemorrhage as a result of low blood pressure, the ease with which intraabdominal operations may be carried out, the good condition of the patients after extensive severe operations, and the lessened postoperative shock and discomfort are well known, and that the conservation of energy is one of the chief factors in lessening the shock, and is greater in this than in any other form of anesthesia, is the belief of the writers.

One of the most valuable things about spinal anesthesia is the rest that occurs in the heart muscle during its effect. In any form of inhalation anesthesia, especially with ether or nitrous oxide, there is a marked stimulation of the heart. That this results in fatigue

after a time is certain and in our opinion the symptom of so-called shock occurring during or following severe operations is often due to exhaustion of the heart muscle, which is primarily caused by the ether drive. During spinal anesthesia the whole splanchnic area is out of commission and the greater part of the blood lies in the large veins of the abdomen. There is no necessity for extra work on the part of the heart, consequently it is at rest and it enjoys a more perfect rest than during the deepest sleep. There is a corresponding fall in both systolic and diastolic pressure and if one desired to secure a perfect rest for the heart muscle no better way could be derived than to administer spinal anesthesia. Consequently, instead of driving a tired organ to its death, as sometimes happens with ether, it is given a period of perfect relaxation and rest. A lowered mortality in certain cases where this is an important factor is alone a sufficient excuse for its use.

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## ORGANOTHERAPY IN GYNECOLOGY.\*

BY

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AND

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THE subject of endocrinology is still in its infancy. Even the most superficial survey of the recent literature on the subject is sufficient to demonstrate that our knowledge concerning this most interesting study is very meager and that indeed few facts have as yet been crystallized from the vast amount of investigation that has been conducted. This applies more particularly to that division of the subject included under ductless gland therapy. One investigator assures us that thyroid extract is a natural antagonist to the ovary, while in the next instant another equally able worker will attempt to demonstrate how these two secretions act as synergists. Whom are we to believe? It might be argued that we shall look to the experimental laboratory for the truth, but the findings in laboratories of this kind where investigations are conducted upon

\* Read before the Obstetrical Society of Philadelphia, November 2, 1916.

normal animals can hardly parallel the conditions which are found in diseased human beings.

As our title indicates, we shall merely consider the use of animal extracts in the treatment of pathological conditions in the female generative apparatus. We have been impressed by the fact that most contributions to this subject have been composed of vague statements and with few exceptions have not been accompanied by case reports or statistics of personal observations. Like many other things in medicine, statements are passed from one authority to the other and accepted without any intermediate "checking up" system. Although our experience in this field has not been extensive, we have kept careful records of our cases and have recently conducted a "follow up" investigation of our results, to the end that we may briefly report what we believe to be the indications for and the effects of organotherapy, exactly as we have found them, irrespective of preformed opinions.

*Corpus Luteum Extract.*—The most useful glandular extract that we have employed has been that derived from the corpus luteum of the ovary. We shall not consider the academic side of the question as this has been done most satisfactorily by many able investigators, but shall confine our remarks solely to the clinical aspect. In the first place, let us state that we have tried the preparation made from the ovary of the sow as well as that made from the ovary of the cow and have noted no difference in their effects, the one is apparently as potent as the other. Secondly, we would call attention to the fact that we see no necessity for the large dosage that has been recommended, since most of our successful results have been attained by means of the use of small doses, as will be seen from our case reports.

We have divided our cases for the purpose of this report into four classes, as follows: (1) Hyposecretion of the ovary due to pelvic inflammatory disease, (2) Natural menopause, (3) Surgical menopause, (4) Functional insufficiency of the ovary.

In the group belonging to the first class, namely, hyposecretion of the ovary due to pelvic inflammatory disease, we have included those cases in which we have found the usual evidences of pelvic inflammation, accompanied by symptoms usually attributed to deficient ovarian secretion, which symptoms we believe are due to the fact that the ovary undergoes inflammatory and sclerotic changes along with the other pelvic organs, with a resulting diminution and perversion of its natural secretion. In this group we have had eleven cases, ten of which have been traced within the last month. The



symptoms presented by these cases were headache, vasomotor symptoms such as flushing and dizziness, headache, lassitude, scanty menses, nervousness and itching and dryness of the skin. The treatment consisted of the internal administration of corpus luteum extract in doses of two grains three times daily for periods varying from one to six months, the average being three months. This was supplemented by appropriate local treatment such as the judicious use of hot douching and local applications of a solution of magnesium sulphate in glycerine.

In this series, the ultimate results have shown that eight patients were markedly improved and have remained free from the symptoms of which they complained at the inception of the treatment; one was well so long as she took small doses of the drug, but the symptoms gradually returned when the drug was stopped. The remaining patient was unimproved in every way, although she was no worse as a result of the treatment. We have analyzed the symptoms of these patients with a view of ascertaining exactly how corpus luteum produces results in cases of this type with the following summary:

Symptom	No. of cases	Improved	Unimproved	Per cent., improved
Backache.....	7	6	1	85
Flushes and dizziness.....	2	2	0	100
Headache.....	9	8	1	89
Oligomenorrhea.....	8	8	0	100
Nervousness.....	1	1	0	100
Lassitude.....	9	8	1	89
Itching of skin.....	1	1	0	100

From this we can see that the scanty menses which are so common in these cases are practically always made more profuse and coincidentally less painful. Furthermore, the vasomotor symptoms are relieved in practically all cases, while headache, lassitude and backache show less favorable but nevertheless good response to the treatment. Before presenting our own opinion on this class of cases, we shall briefly report our results with corpus luteum in cases presenting a different pathology.

We have treated two cases in which the natural menopause was approaching. In one (No. 768) the chief symptom was pruritus of the vulva and relief was obtained after the administration of 6 grains of corpus luteum daily for two months; the other case (No. 156) presented vasomotor symptoms which disappeared after the

administration of corpus luteum in a daily dose of 15 grains for one month, at the end of which time the menses returned and lasted six days—this being the first menstruation that the patient had had in four months.

In one case (No. 131) of surgical menopause with marked symptoms, we saw no improvement as the result of treatment; it might be stated, however, that this patient had been operated upon eighteen months before we saw her.

Our last subdivision consists of two cases of functional insufficiency of the ovary, only one of which we have traced. In this case (No. 71), the patient had an infantile uterus and complained of bilateral ovarian pain at the time of the menses associated with a very scanty flow. Her symptoms were relieved by taking 6 grains of corpus luteum daily for two months.

Now let us consider these results as a whole and formulate an opinion. It is our belief that in cases where all of the ovarian tissue has been removed from the body, that large doses of corpus luteum are necessary and that only fair results are to be expected. On the other hand, when ovarian tissue remains in the organism, even though it be diseased or sclerotic, it is *potentially active* and the administration of small doses of corpus luteum extract causes a stimulation of the ovarian tissue rather than acting as a substitute for the ovarian secretion. It is on this basis that we explain our good results in the treatment of pelvic inflammatory disease by the use of local treatment combined with corpus luteum extract internally. Furthermore, we believe that the beneficial results depend more upon the amount of ovarian tissue in the body than upon the amount of corpus luteum extract that has been administered, since in our series the dose, with few exceptions, was not more than 6 grains daily, which is less than the dosage recommended by Burnam(1), Dannreuther(2), and others. This hypothesis would readily explain the many failures of corpus luteum extract to ameliorate symptoms in cases of surgical menopause, since no ovarian tissue is left in the body which the extract may stimulate. This line of thought readily brings us to a consideration of the advisability of conservative as against radical treatment of pelvic inflammatory disease, but this is beyond the scope of this paper aside from the expression of a feeling that nonoperative treatment does not receive the attention that it deserves.

*Thyroid extract* is probably the most abused of the organic extracts and the indications for its administration, according to even the most recent teachings, are legion. It is our personal belief that

the action of thyroid is synergistic to that of the ovary and it is indicated in cases where either the thyroid or ovarian secretion is below normal. In cases of ovarian hyposecretion, our first choice is always corpus luteum, but many times the cost of this drug is prohibitive and in such cases we have substituted thyroid extract with the hope that a good effect would be produced. Our results, however, have been only moderately encouraging when used for this purpose. We have given it in three cases of pelvic inflammatory disease. One (No. 11) was markedly improved, another (No. 461) was moderately improved, while the third (No. 139) showed no improvement. In two cases of natural menopause, we saw a great improvement in one (No. 27) and no improvement in the other (No. 156); a case of surgical menopause (No. 122) was slightly improved while taking the drug but the symptoms returned after the cessation of its administration. In two cases (No. 23 and No. 373) of ovarian hyposecretion without demonstrable cause associated with amenorrhea, we were rewarded with brilliant results. One of these cases, a girl of eighteen years, who had never menstruated, who was physically and mentally a child of twelve years, showed improvement from the very beginning. She became mentally active, began menstruating and showed enlargement of the breasts, growth of pubic hair and other secondary sexual characteristics. We have a similar case now under treatment, but we do not feel justified in reporting it at the present time as the duration of the treatment has been too short.

Here also, as in corpus luteum therapy, we have pinned our faith in the use of small doses of thyroid extract, never using over 6 grains daily and often using only  $1\frac{1}{2}$  grains a day. The average duration of treatment has been about two months.

*Pituitary Extract.*—We believe that the secretion from the pituitary body is antagonistic to that of the ovary in so far as its effect upon the uterus is concerned and our chief indication for the use of pituitary substance has been in the treatment of uterine bleeding of uncertain etiology. We have had six cases in which we have tried the drug but unfortunately have only been able to trace four of them. In two cases (No. 648, No. 277) the patients were suffering from menarchial hemorrhages (profuse menorrhagia and metrorrhagia occurring at puberty) and were both promptly cured by the administration of small doses of pituitary substance, one receiving  $\frac{1}{2}$  grain three times daily and the other 1 grain three times daily. Another case of closely allied origin was that of a young woman (No. 750) twenty years old, who was having profuse menorrhagia,

severe enough to confine her to bed for two days at each period and the menses were recurring every two weeks. She was showing signs of weakness as the result of the loss of blood. The history and pelvic examination threw no light on the subject. A diagnosis of ovarian menorrhagia was made and she was given 1 grain of pituitary substance three times daily. Her last report was that she had not menstruated for three weeks and her general condition was markedly improved. In our other case (No. 703), we tried the effect of pituitary substance in a case of bleeding due to chronic metritis after the usual uterine styptics had failed, but we can record no improvement from its use. This patient was advised to have a curettage and radium treatment.

As a result of our study, we have been impressed by the fact that each case is a law unto itself. In many cases, the symptomatology is not as definite as we would like it to be and we must try one drug after another before we find the specific for which we are searching, but as our experience increases, we find that we reach the proper drug more quickly than formerly. We also believe that in many cases a combination of two of these glandular substances may have a better effect than one alone and latterly we have been employing ovarian and thyroid extracts in combination with encouraging results.

In conclusion, let us state that we realize that our work is scarcely a drop in the bucket, but we believe that if everyone would report unbiased opinions, deduced from carefully kept records, there would soon be a unanimity of thought along these lines.

Case reports are as follows:

#### CORPUS LUTEUM.

No. 527.—Age twenty, married; severe lumbar pain, general indisposition, headache, scanty menses, duration one day. Examination reveals slight tenderness on right side, small mass on left side. Corpus luteum gr. ii. t.i.d. Result: headache, backache and nervousness markedly improved, menses more profuse and less painful.

No. 270.—Age twenty-five, single; scanty menses during past two years, attacks of dizziness, headache, right-sided pain and vesical frequency; left oophorectomy two years ago. Examination reveals induration in the right broad ligament. Corpus luteum gr. ii. t.i.d. Result: marked improvement, headache and dizziness practically gone, periods more profuse.

No. 41.—Age twenty-five, married; scanty menses during past year lasting only a few hours, frequent headache, general indisposition, backache, sterility. Examination reveals the uterus retro-

verted and adherent. Corpus luteum gr. v. t.i.d. Result: menses appeared more profuse after two months of treatment and lasted two days, in three months periods were normal and patient had no further complaints.

No. 87.—Age thirty-six, married; scanty menses with lateral pain, constant headache, backache, general indisposition, pain in right side. Examination reveals a large, boggy, tender uterus and bilateral induration. Corpus luteum gr. ii t.i.d. Result: in three months, the symptoms had completely subsided, now takes corpus luteum for one week before her periods. Menses are much less painful and more profuse.

No. 93.—Age thirty-three, married; pruritus vulvæ, menses very scanty during the past two years, pelvic pain on the right side, severe headache and backache especially marked for two days before the period, polyuria and general indisposition. Examination reveals an adherent retroversion with bilateral adnexal tenderness. Corpus luteum gr. ii. t.i.d. Result: patient markedly improved in one month, menses being more profuse and less painful. Takes corpus luteum for one week before each period to prevent headache and nervousness.

No. 420.—Age twenty-one, married; menses irregular and scanty during past two years, constant backache, bilateral pelvic pain, easily exhausted, headache and sterility. Examination reveals an acute ante flexion of the uterus, left ovary adherent and tender and slightly enlarged. Corpus luteum gr. ii. t.i.d. in combination with Blaud's mass gr. v. t.i.d. Result: in two months the periods were more regular and free, no backache nor headache, less nervous, gained 5 pounds in weight, feels much stronger and is able to perform her regular work.

No. 469.—Age forty-three, married; scanty periods lasting one day, backache, headache, hot and cold sensations, general pruritus, vesical irritability. Examination reveals bilateral adnexal inflammation. Corpus luteum gr. ii. t.i.d. in combination with Blaud's mass gr. v. t.i.d. Result: in one month there was marked improvement, headache, backache and all other symptoms had practically disappeared. Says she "feels better than during past four years."

No. 129.—Age forty-four, married; menses very irregular and profuse associated with intense backache and bilateral pelvic pain; headache, nervousness, hot and cold sensations, marked bladder irritability. Examination reveals bilateral adnexal inflammation. Corpus luteum gr. ii. t.i.d. Result: no improvement in any of her symptoms.

No. 85.—Age twenty-eight, married; painful, scanty periods, pelvic pain on right side, worse at time of periods. Examination reveals a large eroded cervix and tenderness on right side. Corpus luteum gr. ii. t.i.d. Result: marked relief of pain and increase in amount of menstrual flow as long as patient took corpus luteum. Periods again became scanty upon cessation of drug.

No. 509.—Age forty-eight, married; menses scanty but painless,

backache, hot and cold sensations, headache and dizziness, localized pain in the right side. Examination reveals bilateral adnexal tenderness and induration. Corpus luteum gr. ii. t.i.d. Result: three weeks later the menopausal symptoms were well controlled and in three months complained of no symptoms. Periods more profuse.

No. 768.—Age thirty-nine, married; severe headache, backache, hot and cold sensations, itching and dryness of the skin, scanty and irregular periods, general nervousness and indisposition. Examination reveals uterus in good position, other findings negative. Corpus luteum gr. ii. t.i.d. Result: in two months all of the symptoms had markedly improved, patient more cheerful and much more active and able to perform her usual duties.

No. 156.—Age forty, married; irregular menses and scanty flow, constant headache and backache, hot and cold sensations. Examination negative. Corpus luteum gr. v. t.i.d. Result: one month after taking corpus luteum, patient menstruated for six days—the first period in four months—and felt exceptionally well; no vasomotor symptoms.

No. 131.—Age thirty-six, married; hysterectomy and bilateral salpingo-oophorectomy eighteen months ago, polyuria, headache, backache, nervousness. Examination negative. Corpus luteum gr. v. t.i.d. Result: unimproved.

No. 71.—Age thirty-seven, single; periods scanty and associated with severe pain and sometimes convulsions, backache, headache and general weakness. Examination shows an infantile uterus. Corpus luteum gr. ii. t.i.d. Result: periods more profuse and patient notices marked improvement in other symptoms.

#### THYROID.

No. 139.—Age thirty-two, married; hysterectomy and left salpingo-oophorectomy for inflammatory disease two years ago; now complains of hot and cold sensations, dizziness, nervousness and pain on right side. Examination reveals tenderness and induration on the right side. Thyroid gr. ii. t.i.d. Result: no improvement.

No. 11.—Age twenty-five, married; menses irregular and very painful, backache, headache, itching and dryness of skin, nervousness; left ovary removed a few years ago. Examination reveals a retroverted uterus and tenderness in both broad ligaments. Thyroid gr. i. t.i.d. Result: in one month menses were more profuse and less painful, itching and dryness of skin markedly improved, headache less.

No. 461.—Age twenty-three, married; menses irregular and painful, associated with backache and headache. Examination reveals uterus enlarged and retroverted and infiltration in both broad ligaments. Thyroid gr. ii. t.i.d. Result: markedly improved.

No. 156.—See previous history; thyroid gr. i. t.i.d. for two months with no improvement.

No. 27.—Age fifty-three, widow; irregular menses, backache, headache and intense nervousness, pain in ovarian region on left side.

Examination reveals no pathology. Thyroid gr. ii. t.i.d. Result: in three weeks began to feel much better, since then has steadily improved.

No. 122.—Age thirty-three, married; menses irregular and scanty, backache, headache, intermittent watery discharge preceded by pain. Examination reveals the uterus in good position, induration in left broad ligament. Thyroid gr. i. t.i.d. for three months. Result: slight improvement while taking the drug.

No. 23.—Age thirty-eight, married; menses irregular and scanty, backache, dull headache, bilateral pelvic pain. Examination reveals the uterus retroverted, otherwise negative. Thyroid gr. i. t.i.d. Result: much improved in every way except for continuance of vasomotor symptoms.

No. 373.—Age eighteen, single; has never menstruated. Examination reveals no gynatresia; physical appearance of a child of twelve years, breasts not developed, no pubic hair, mentally dull. Thyroid gr. i. t.i.d. Result: in seven weeks had lower abdominal cramps but no menses. Two months later menses appeared for one day. Three months later menses appeared for two days. Coincident general improvement in every way.

#### PITUITARY.

No. 703.—Age thirty-nine, married; menses profuse and had menorrhagia when first seen, backache and headache. Examination reveals uterus retroflexed and enlarged. Diagnosis chronic metritis. Pituitary gr.  $\frac{1}{2}$  t.i.d. Result: no improvement.

No. 648.—Age thirteen, single; menses began six months ago and have continued freely almost continuously since. Examination negative. Pituitary gr.  $\frac{1}{2}$  and Blaud's mass gr. v. t.i.d. Result: complete cure.

No. 277.—Age fifteen, single; periods very profuse for six months and has had metrorrhagia for past month. Examination negative. Pituitary gr. i. t.i.d. Result: two weeks later bleeding had markedly subsided; six months later, periods regular and normal, duration four days.

No. 750.—Age twenty, married; for past ten weeks has been menstruating every two weeks, severe headache, lower abdominal pain. Examination reveals an acutely anteverted uterus. Pituitary gr. i. t.i.d. Result: intermenstrual period increased to three weeks and flow is less profuse.

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2. Dannreuther. *Jour. A. M. A.*, 1914, lxii, 359.

1503 GIRARD AVENUE.

715 NORTH FORTIETH STREET.

RELATION OF THE GLANDS OF INTERNAL SECRETION  
TO THE FEMALE PELVIC ORGANS.\*

BY

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IN view of the increasing interest and literature concerning the glands of internal secretion, and the attention paid to the subject by various workers in all branches of medicine, it is worth while to consider briefly how far practical gynecology has been advanced by these studies. The field affords abundant scope for the play of the imagination, and not a few practitioners have been led astray by the writings of enthusiastic, but not too well-balanced investigators, supplemented by the advertisements of the manufacturing druggists, so that they have accepted as dicta, based upon solid facts, what in reality were merely fantastic theories. Nevertheless, not a few definite lesions in various parts of the body, or pathological conditions, have been proved to be due to irregularities in the functioning of these glands; and it is the intention to discuss here the influence of some of the glands of internal secretion upon the female generative organs.

Although the glands of internal secretion form a complete and balanced system, certain of them seem to be definitely interrelated in their function. Thus, for practical purposes, the hypophysis, thyroid, and ovary, may be grouped together. Closely associated with this group, by reason of its interaction with the thyroid, is the adrenal; but as yet I have never met with a case which clinically suggested involvement of the last-named gland. The justification for the grouping together of these three glands may be mentioned as the disturbance of menstruation in goiter cases, especially in Graves' disease, and the fact that in colloid goiter cases there are many examples of thyroid enlargement during the menstrual flow. Again, we find that amenorrhea and impotency are frequently associated with disease of the pituitary gland, and lastly, experimental evidence has shown the effect exerted by the extract of the anterior lobe of the hypophysis upon the development of the female genital tract. The action of the posterior lobe of the hypophysis upon smooth muscle, especially of the uterus, is well known from its use in obstetrical practice.

\* Read before the Semiannual Meeting of the Medical and Chirurgical Faculty of Maryland, at Rockville, Oct. 17, 1916.



Evidently then, in health, the ratio between these secretions in the tissues is approximately constant, and disturbances in the balance of this ratio may bring about pathological conditions, such as those belonging to exophthalmic goiter, Addison's disease, myxedema, and the various abnormalities associated with the menopause.

In all probability one gland is stimulated by the active principle, or principles, from one or more in the series, a phenomenon analogous to the stimulating action in the cycle of the digestive juices. Formerly it was held that the ovaries alone were responsible for the development of the female generative organs; but recently it has been shown that the ovaries are stimulated by the action of the hypophysis. This work was done by Goetsch(1), who fed the dry extract of the hypophysis to rats, and found that the extract of the anterior lobe causes an abnormally rapid development of the whole generative apparatus, evidenced not only by early development, but also by a corresponding increase in the sexual activities and pregnancies. Moreover, it has long been known clinically that, as a consequence of destruction of the hypophysis by tumors or trauma, there is a loss of sexual power and desire, as well as atrophy of the parts.

In exophthalmic goiter, marked disturbances of menstruation are known to occur—delayed periods, or even prolonged amenorrhea. Should there be a return of the menstrual flow, menorrhagia and dysmenorrhea may be present, and there may be an exaggeration of the nervous symptoms.

Hypofunction of the ovary is evidenced by the changes following early castration, such as enlargement of the anterior lobe of the hypophysis, growth of the long bones, and deposits of fat. Hyperfunction of the ovary is thought to be responsible for the menorrhagias, premature sexual development, and uterine glandular hypertrophy.

In the observations of cases, illustrating disturbance of interglandular actions, which have come under my care, three instances of prolonged amenorrhea, showing the return of menstruation after lutein therapy, are of especial interest, and will be reported here.

In the cases in which there had been cessation of menstruation, the breasts were the first organs to give evidence of ovarian hypofunction. Usually a dull pain, or heavy sensation was noticed in these glands, or they became much enlarged owing to a deposit of fat. This accumulation was first noticed in the breasts, and was quite out of proportion to that deposited in any other part of the body. The breasts readily respond to glandular therapy, and show changes indicative of the progress of the treatment. For instance, soon after

the administration of ovarian extract is begun, there is usually an accumulation of an opaque, watery fluid in each breast, which can readily be expressed, or is even forced from the nipple by the pressure of the clothes, or by gravity, when the patient assumes the bending posture. The pain and discomfort which is quite commonly and constantly present in the cases of amenorrhea, especially in the obese woman, is rapidly lessened after the ingestion of the ovarian extract. These manifestations were always intensified at about the end of every fourth week—or approximately at the time for the menstrual flow. Upon the reappearance of the flow, the breast secretion gradually diminished until a normal condition was again reestablished.

That the breasts and ovaries are closely associated in the body mechanism is evidenced by the fact that the breasts usually enlarge at each menstrual period, and that excision of the ovaries before puberty removes the stimulating element necessary for the development of the breasts. I have not, however, been able to find a report of any instance in which a discharge from the breasts was noted after the therapeutic use of luteum extract, such as was observed in the three cases here described. In cows Hammond(2) used pituitary extract, and Gavin(3), pituitary and corpora lutea extracts for the galactagogue effect, but no definite increase in the milk output was noticed. Similarly Schaefer(4) gave a few doses of luteum to a lactating woman, without any perceptible effect.

The condition of body nutrition, or the disposition of the fat is interesting. In the majority of the cases in which changes were evident, there was a marked tendency toward an accumulation of fat, whereas in one case there was a definite loss of body weight, which was regained upon the return of menstruation.

The condition of atrophy of the uterus due to lactation is probably most beneficially influenced by glandular feeding, as is evidenced by the following case:

CASE I.—Mrs. E., aged twenty-six years. Her baby was eighteen months old, and had been breast-fed for twelve months. The patient had not menstruated, nor had she had any unusual sensations or symptoms at any month during this year and for the following six months. The uterus was approximately normal in size. No attempt had been made to avoid pregnancy. The woman was thin, nervous, and much worried lest her sterility would prove permanent. The uterus was curetted, but nothing to account for the condition was found. When she left the hospital, she was given the corpora lutea tablets, 5 grains being taken twice daily for six months. About ten days after this treatment was started, the patient began

to have a most profuse flow from the breasts, the condition being so marked that it was necessary for her to wear a small pad over each nipple. In fact, any sudden or bending-forward movement would cause the discharge of a rather thick, white material from the breasts. This condition persisted for five months, when the breast flow lessened, and a clotted menstrual flow appeared, which has continued regularly and normally since (fourteen months).

Just what took place here, is not clear, but it is evident that the active ovarian extract given, in the presence of the atrophied uterus and denuded endometrium, stimulated the cells of the breast to this remarkable degree of activity. Following the return of the menses, the patient felt much better physically, and gained 17 pounds in weight—a conclusive evidence that the presence of a proper ratio of the body regulators is necessary for normal metabolism. In view of Goetsch's work, which shows that an extract of the anterior lobe of the pituitary gland stimulates the generative organs, we now feel that in such a case the extract of this lobe should first be used, and then followed with that of the ovary.

On December 12, 1916, the patient wrote: "I have no pelvic trouble. My menses are regular, the flow lasts six days, and there is very little discomfort at this time. It seems quite remarkable to me that I am really normal again."\*

CASE II.—Miss D., aged twenty-five years. Complaint: amenorrhea. Family history negative, Past history negative. Past illness: The menses began at fifteen, and were regular for six months. Then she had a severe attack of measles, after which for the next ten years, the patient menstruated only once or twice each year. The pain was severe at these times for three days—during first two days before, and during the first day of flow, which was very scanty. There was a stinging sensation in the lower left abdominal quadrant at times. Increase in weight followed from 100 to 160 pounds. The breasts were the first parts to become fat, and when she came to me they were quite pendulous. At operation (June 9, 1916), when a chronic appendix was removed, the ovaries were found to be approximately normal in size, but there seemed to be a tough, parchment-like covering over each, probably a thickened albuginea. A small dermoid cyst was removed from the left ovary. On the sixth day following the operation, lutein therapy was started (5 grains three times a day), and has been continued. The patient has been out of the hospital for four months; she has menstruated twice, each period lasting four days, the flow being normal, and without pain. She is free from breast discomfort, and feels much better generally.

On December 13, 1916, the patient wrote: "Am getting on fine—really very much better than I thought I would. I menstruated in September, November, and December. The flow is profuse, and lasts five or six days. My appetite is fine, and I feel very much

\* Another case of unusual interest is that of a woman, who following a hysterectomy and removal of one ovary, at the time of her next period, had a discharge from the breasts for four days. No nose-bleed, or any other symptoms or disturbances were noted.

stronger—in fact, I feel better than I have for the past several years. I am teaching school, and stand the work very well.”

CASE III.—Mrs. A., aged twenty-nine years. Complaint: amenorrhea. Family history negative, Past history: Measles at eighteen, the only illness. Menstruation began at fourteen, and was regular every four weeks for four years, the flow lasting seven or eight days. After eighteen, the flow lasted two to three days, and at times was scanty until the patient was twenty-two. Since that time she did not menstruate until about one year ago. There was then a stain for one day (she had been taking ovarian extract for six months). At this time the breasts were painful, especially to pressure, and contained a thick, opaque secretion, which has persisted for the past year, but is lessening in amount. Soon after luteum was begun, the secretion would flow from the nipples upon the lightest pressure on the breasts. After the first evidence of the returned menstruation, the patient had no further flow for five months, when there was again a stain for one day. One month later, a flow appeared, which lasted five days. Between that time and the present the patient had a small pinkish discharge for one day, and at the time for the next period the flow appeared and lasted three days. The patient feels much better. The pain in the breasts is not so severe.

At eighteen years of age, the patient weighed ninety-eight pounds. With the onset of the amenorrhea, the weight increased to 175 pounds, and remained so until last year. She now weighs 144 pounds. She has been married six years. At times there was sexual desire until the age of eighteen, since when there has been none until within the past three months.\*

The therapy in this case was the same as in the previous one: (lutein, 5 grains, t.i.d.), and has been continued for a year.

Thus, in one case the patient was amenorrheic for eleven years, the other practically so for seven years. Both patients, immediately prior to the onset of the amenorrhea, had had a severe attack of what was diagnosed as measles.

As a result of Burnam's work, the value of the ovarian extract at the menopause, normal, or surgically induced, is well known to all. Another evidence of our advancement in this study is seen in the fact that extracts from the whole ovary were formerly employed, whereas the best results have been obtained by using the corpora lutea of the pregnant animal, which contain the activating principle. The whole glandular extract is again being used by some men.

In directing our attention to another group of cases—patients having infantile pelvic organs—we now have great hopes that they will respond to the anterior lobe and ovarian extract treatment, and this is what is to be expected when the physiological action of these drugs is considered. (These cases will be dealt with in a later paper.)

\*January 3, 1917, the patient wrote that she had menstruated twice since October. The flow which was small in amount appeared at the regular time.

An interesting fact in this work, is, that young individuals react better and sooner to the stimulating influences of these glands than do older ones. For instance, a girl in her early menstrual life, suffering from amenorrhea or dysmenorrhea will show more change than one in midmenstrual life. If the pelvic organs are the only evidence of a dwarfed growth, the outlook is more encouraging than if the disease is combined with other evidences of glandular disturbances, such as myxedema, or Addison's disease.

During the treatment of these cases, no toxic symptoms were noted. One patient had some circulatory disturbance, such as cold hands and feet, together with cyanosis, conditions which were relieved by stopping the tablets for a week, after which, they were again taken, but without any return of the disturbances.

In giving the glandular preparations, the material is prepared in tablet form, with the size of the dose more or less arbitrarily declared by the manufacturer. One or two of the tablets are given daily, according to the case, and those of the hypophyseal and ovarian extract can be given together during the same time. If the case is one in which both of the substances are indicated, the hypophyseal extract may be given first for a week or ten days, and *corporea lutea* extract then added. A preparation for intramuscular injection is also on the market. With this method fewer doses are required, but it has the disadvantage of requiring frequent office visits for the patient.

In looking for results, one must not be too eager, for in long-standing cases, such as those of amenorrhea, it has required several months—four to eight—before there was any evidence of a return of the menstrual flow, and possibly three or four more, before it was regularly established. The breasts, however, indicated, by the presence of the secretion and the lessening of the pain, that some effect had already been produced upon the organism. This clinical method of selection of the kind and amount of the extract to use is somewhat indefinite, but until other means are devised, such as chemical determination, or ferment reaction in the blood, it must needs be utilized.

In conclusion it may be said: There are definite conditions associated with the female pelvic organs, which are indicative of an abnormal condition of some of the glands of internal secretion. The hypophysis, thyroid, and ovary, are intimately associated; that gland therapy is of value in cases of lactation atrophy of the uterus, in certain cases of amenorrhea, and in women at the menopause. It has been observed that the breasts respond sympathetically to

changes in the pelvic organs when there is disturbance in the internal secretion of the latter, as is evidenced by their accumulation of fat. Furthermore, they are often painful, and in certain cases of amenorrhea, after the ingestion of the luteum extract, they secrete an opaque, watery fluid. Lastly, we have reported two instances of cessation of the menses, associated with an accumulation of fat, following an acute infection, which had occurred early in the menstrual life, and was thought to be measles.

## REFERENCES.

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THE WINONA. PARK AVENUE AND MONUMENT STREET.

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THE END RESULTS OF CESAREAN SECTION.\*

BY

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THE fundamental principle of obstetrics is to deliver a healthy child from a healthy mother in a manner which traumatizes, or otherwise damages, one or the other in the least possible manner. This must constantly be the standard by which we measure the value of one and all our efforts.

Diagnostic ignorance of the past led to conservatism, which resulted in disaster. Diagnostic ignorance of the present leads to radicalism, which results in the abuse of that easy way out of obstetrics difficulties, Cesarean section.

The purpose of this paper is to study the results of our efforts in the employment of abdominal delivery, and particularly to examine the end results so far as we have been able to learn them. The material consists of 148 consecutive cases of abdominal hysterotomy from the Obstetric Services of the Methodist Episcopal and Jewish Hospitals of Brooklyn, of which Dr. Ralph Beach and the writer have the privilege of serving as Attending Surgeons at the present time. These operations were performed by seven men associated with the staffs, but chiefly by Dr. Beach and myself. They are incident to 6493 deliveries which have occurred in the two hospitals up to January 1, 1916.

\* Read at a meeting of the New York Obstetrical Society, November 14, 1916.

While this is not a large number of cases, it fairly represents the standing of Cesarean section in a community where material comes not only in supervised cases, but chiefly from an active general hospital ambulance service. It affords a point of view a little different from that of the maternity hospital *per se*. We have had to deal more with Reynolds' second and third class cases; those with more or less labor with ruptured membranes, and one or more examinations, only twenty-seven cases having had no labor.

Dystocia due to disproportion is by far the most frequent indication in this report. One hundred and nine cases, in three of which prolapse of the funis was also found. This indication is somewhat better understood than a few years ago. We know that it is not a mere matter of pelvimetry, and that many so-called narrowed pelvis will permit the passage of a live child. The problem is much more complex. The difficulty lies in estimating the balance of the size of the pelvis and its shape, the shape and malleability of the head, the power of the individual uterus, and the angle of the plane of the inlet to the axis of the force exerted. Whether the shape and accommodation of a given pelvis is ample still remains a matter for the judgment of the individual operator, based on experience in examination with the whole hand in the vagina, fitting the head to the opening. How few, if any means have we of knowing the power of any uterus before labor has begun. It is in the estimate of these factors wherein lies the greatest demand for judgment in obstetrics. The ultimate solution of this problem we shall hope will be, a decision for abdominal delivery before the beginning of labor, upon a complete physical examination of the patient in experienced hands. At present, the test of labor, with its drawbacks, is the only guard against radicalism. Lack of progress in the labor with due consideration for when and where this occurs, is to my mind, the key to the decision for or against abdominal delivery, in the presence of disproportion. All known methods of preventing infection must be diligently followed, *chief of which is the employment of rectal examination.*

While disproportion is the most frequent indication, dystocia from the soft parts alone led to Cesarean in several cases. Ventral fixation intentional or accidental was the cause for ten operations, and one case of dystocia from a Coffey plication. All of these cases had the same pathology; the shelf of thickened anterior lower uterine segment, the high posterior displacement of the cervical opening at or above the promontory, and the sacculation of the posterior wall of the uterus containing the baby.

One full term pregnancy after an interposition operation, in which the cervix had been amputated high up, gave an interesting pathology, in that the uterus had torn itself away from its anchorage in part, the scars of the sutures being marked distinctly high on the anterior uterine wall, while the bladder remained low down. No cervical opening was to be found and the presenting part did not engage at all. There were also one case of vaginal stenosis and one of bony tumor, an osteoma on the posterior surface of the lateral ramus of the pubes.

Three cases of contraction ring with impending rupture of the uterus gave three live babies, from uteri foul with odorous meconium, without serious morbidity to mothers.

Ovarian cysts were the causative factor in three cases. One as large as a football, with twisted pedicle, was removed at the time of operation. Two were intraligamentous cysts, one of which it was not deemed advisable to attempt to remove owing to the multiplicity and size of the veins present.

Impacted face presentation, with the chin posterior and tonic uterus was three times treated in this manner.

Accidental hemorrhage led us to operate in two cases, one of them in which the hemorrhage was caused by a bougie employed in an attempt to induce labor, in a slightly justminor pelvis.

Placenta previa we found as an indication in only one case. Our feeling about placenta previa being; that except in the presence of a full term baby in a primiparous woman, with unprepared soft parts, other methods of delivery are preferable.

Oversize and overtime children twice afforded an indication.

The much discussed employment of Cesarean in eclampsia is in favor in our hands. We have done ten sections for eclampsia, and there was no maternal mortality in the series. We feel that the early removal of the primary cause in eclampsia is both sane and logical, and prefer the abdominal route where the child is over eight months and no labor is present.

*Mortality.*—We have never let the dread of problematical infection permit us to allow an apparently normal child to be sacrificed. Craniotomy to a living robust child is murder, and yet craniotomy on a dying child is euthanasia and may save a mother's life.

We lost two mothers in this series. One a ventral fixation case in which sterilization by salpingectomy was done, died of sepsis and general peritonitis on the twentieth day postpartum. One a primipara of poor physical stamina died of acute streptococcemia thirty-six hours after section. A mortality of 1.357 per cent.



*Infant Mortality.*—All the babies were born alive. Eight died before leaving the hospital; three of these were prematures. The others were twins from an eclamptic mother and one from the twisted ovarian cyst case. One child died from hemophilia; one from pemphigus; one from diaphragmatic hernia. One succumbed to pneumonia on the twelfth day. One was suffocated from overlying by a vicious mother. Outside of the three prematures in which the operation was done entirely in the interest of the mother, none of these died from any reason traceable to the form of delivery.

*Complications.*—As would be expected in the class of cases with which we are dealing, we had a very considerable morbidity. Forty-eight cases had a temperature over  $101^{\circ}$  F.;  $33\frac{1}{3}$  per cent. of the series. Three of the cases had very severe sepsis and only recovered after a prolonged illness.

Enumerated categorically, the causes of the temperatures were as follows: Retained lochia, five cases; mild sepsis, ten cases; pelvic cellulitis, one case; phlebitis, five cases; pelvic peritonitis, one case; mastitis, four cases; breast abscess, four cases; pneumonia, five cases; pyelitis, one case; severe sepsis with empyema of the chest and pelvic abscess, one case; infected wounds, eleven cases. In other words, 100 cases had no temperature over  $101^{\circ}$  F. Primary union occurred 137 times. Two cases had excessive postpartum bleeding; and three had acute gastric dilatation.

Abdominal distention was a very prevalent complication, until we uniformly employed a flat sand bag, weighing 5 to 8 pounds, on the abdomen for the first few days. The patients are not allowed anything by mouth for twenty-four hours, and then only small amounts of water for another day. A Murphy drip supplies the needed fluids to the body, and in part satisfies their thirst. The Fowler position is employed after reaction as a prophylactic against upper abdominal infection and as an aid to drainage.

*Technic.*—There are just a few points in our technic, to which I would refer. We believe a standardized rapid technic has a distinct effect on the success of the procedure. We use a medium high, short incision, two-thirds above and one-third below the umbilicus, through the rectus muscle, on the grounds that this gives us less trouble from intestines, and easier manipulation of the uterus, than the high incision. A preliminary hypodermic of fifteen minims of pituitary extract just as the incision is being made makes the operation surprisingly less bloody. The abdomen is protected by three large moist abdominal pads, two laterally and one above the uterus. The uterus is firmly held against the abdominal incision

by lateral pressure by an assistant. The uterus is opened by a careful puncture with a scalpel and enlargement with straight scissors. This also diminishes the hemorrhage. After the birth of the child the uterus containing the placenta is hooked out of the abdomen by the hand in the upper angle of the uterine wound. The suturing is done with long straight Keith needles, all threaded previous to operation with No. 2 chromic catgut, inserted about one and a half cm. from the peritoneal edge of the cut down to the very edge at the bottom of the cut, and out the other side in similar manner. These are inserted about 2 cm. apart the whole length of the wound before tying, and after tying them a half depth suture is placed between each deep suture. The ends are cut and the uterus replaced in the abdomen. The peritoneum is closed by running catgut suture and the abdomen closed by crossed silkworm-gut sutures of the fascia and skin.

In considering the end results of Cesarean section we have contemplated: First, its results as effective in attaining a purpose. Second, its results on the future health of the mother. Third, its results on her future child bearing. As to its results in attaining the fundamental principle of obstetrics. In the consideration of the child, it is recognized as "the most certain method that exists of delivering a living child." In the consideration of the mother, in this series of cases it gives a mortality of 1.357 per cent., which we realize is below the average for the operation on all classes of cases and is lower than we expect to attain on a longer series. It satisfies us, however, that the results were better than in any other method of delivery which we might have employed in these particular cases. We question the advantage of the extraperitoneal section, with possibly the exception of the morbidity, which greater experience may show to be lowered by this method. We believe a virulent infection will be just as disastrous in one as the other. We agree with E. P. Davis and others that hysterectomy with extraperitoneal treatment of the stump is the best treatment for the known badly infected case, but our experience leaves us in doubt just how we are to judge which case needs this more radical procedure. Very seldom is the baby in a known badly infected case in condition to justify Cesarean. We cannot concede that the mere presence of pathogenic organisms within the uterus is an indication for hysterectomy in abdominal delivery any more than in pelvic delivery.

In an effort to find out what effect Cesarean has on the future health of the mother we endeavored to communicate with our cases. As many of the patients belong to the wandering Ghetto population

we had only fair success. We heard from seventy-five cases either by letter or by interview. In reply to the question, "Did you get well rapidly after leaving the hospital, if not what was the trouble, and is your general health as good since the Cesarean operation as before?" sixty answered, "Yes," and a study of the replies of the other fifteen showed nine cases complaining of abdominal pains, apparently from adhesions. In one case this pain was so great as to lead to reoperation, a ventral fixation case in which the uterus had become adherent to the scar of operation and was drawn out to a long thick band; after a hysterectomy she was entirely well. Repeated Cesarean increases this tendency to adhesions and in three of the cases symptoms were not complained of till after the second or third Cesarean. We have frequently found at later examinations the uterus held high out of the pelvis by such adhesions, but not adherent to the abdominal scar directly except in the one case noted. We know no way of preventing these adhesions.

The abdominal scar after Cesarean is not prone to hernia in our experience, only four cases having come to our attention.

Three complained of cystitis and one had pyelitis delaying their return to health. Two cases complained of symptoms of continued nephritis after eclampsia. One of phlebitis in the femoral vein.

The menstruation was reported as regular by sixty-four women, nine complained of irregularity, and of these nine, seven were cases who had complained of pains in the abdomen, from adhesions, and it seems fair to conclude that the adhesions act as a definite cause for menstrual disturbances after this operation, probably by the disturbed circulation from the uterus being dragged high up in the abdomen.

We conclude that abdominal delivery has no greater effect than pelvic delivery on the future health of the mother.

In regard to the relation that Cesarean has to the future child bearing of the mother. In this series, two women only reported having had miscarriages. Twenty-three had two Cesareans, and four had three Cesareans. Eleven of these repeated Cesareans have been performed since the time covered by this series of cases without fetal or maternal mortality.

Two women have been delivered of live babies from below, one of them twice since her Cesarean. Both of these women had no disproportion, one having been operated for accidental hemorrhage and the other for oversize baby.

Our opinion is that whenever a Cesarean is done for disproportion, all succeeding births should be by Cesarean. However, when the

indications are other than disproportion succeeding births may be by the normal passages providing the uterine scar has healed by primary intention after proper suture.

In conclusion it seems to me that the evolution of the Cesa-rean family is not at all an obstetric fad, the results of the glamour of operative surgery, but rather a permanent scientific step in advance based on the application of sound surgical principles to the fundamental principle of obstetrics.

327 WASHINGTON AVE.

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## GYNECOLOGICAL POSTOPERATIVE TREATMENT AT THE LONG ISLAND COLLEGE HOSPITAL.\*

BY

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THIS paper is not an attempt to verify by statistics the superiority of postoperative treatment of gynecological patients in the Long Island College Hospital over that employed by other operators. It represents, merely, a statement of facts, in that it outlines the technic of a radical departure in our after-treatment, which has given such uniformly good results, in comparison with former methods, as to suggest its presentation. Proof of its efficacy is seen in the distinct improvement of the patient's general condition and morale within a short period following operation.

Briefly outlined, it comprehends four distinct steps.

After the patient has been returned to her bed and placed in whatever position the operator elects, the following "four-step-routine" is carried into effect:

1. Morphinization of the patient.
2. A rectal tube is placed in position.
3. Sandbags are placed on the abdomen.
4. Olive oil is administered by the mouth.

Each step will be considered seriatim.

*Morphinization of the Patient.*—One-fourth of a grain of morphine sulphate is given immediately after the first vomitus following the administration of the olive oil. Then  $\frac{1}{12}$  of morphine is given hypodermatically, afterward, every three hours for forty-eight hours. We notice: (1) less pain; (2) the patient has a comfortable night and

\* Read before the New York Obstetrical Society, November 14, 1916.

wakes refreshed in the morning; (3) shock of operation is lessened and nerve tension is relieved.

A mooted question in the after-treatment of surgical cases is that relating to the exhibition of morphine. All operators are not agreed; in fact, some vigorously protest its use. Whether or not their contentions are sound is a debatable question. Certainly, they are not, judging from our success.

The opinions of a few well-known operators with regard to the use of morphine after operation furnish interesting comparisons.

Ashton writes that he does not administer morphine if it can be avoided, as it unsettles the stomach, decreases peristalsis, increases thirst and diminishes the output of urinary secretion.

Graves does not use morphine in routine work, *i.e.*, ward cases, but says he has not been able to consistently carry out the rule with his private patients. He, however, adds that in his average cases, when morphine is indicated, it is his practice to give one-sixth of a grain by hypo if the patient is beginning to get restless or is becoming tired out from pain and loss of sleep.

Reed states that "morphine and its congeners are invariably doubtful and generally dangerous remedies in abdominal surgery, as they arrest peristalsis, provoke vomiting and prevent elimination." His statement is then qualified by his saying that "in certain extreme cases, morphine may be given as the lesser of two evils."

Moynihan: "the administration of morphine is rarely necessary nowadays after operation. More especially since the introduction of Crile's anoci-association method has the pain after operation been quite inconsiderable. I never withhold morphine if the patient is suffering. In old days we were afraid of morphine and surgery was often cruel. One-sixth or one-quarter will give a peaceful night and the patient wakes refreshed and cheered by the repose. I do not think this amount of the drug causes any flatulent distention of the intestines; indeed, I think by relaxing a spasm of the bowel, it may aid in the expulsion of gas. My own chief aim is to rob surgery of its terrors. To-day, we use morphine sparingly, but to the great advantage of our patients."

A critical review of these four opinions boiled down shows that though the use of morphine is not encouraged, it is almost universally employed; and it is a fair assumption to infer that we all use it, just when and how we choose. The opinion of all of the staff at the Long Island College Hospital is unanimous in their approval of morphine for two days and in the  $\frac{1}{12}$ -grain doses. The relief of pain is an important desideratum. Pain occurring in the first twenty-

four or thirty-six hours is usually traumatic and not gas distention. The pain occurring forty-eight hours after operation is usually inflammatory. Morphine will control shock, as every medical man knows, and Crile has impressed us with the necessity of the avoidance of shock, both by pre- and postoperative measures. Morphine in one-twelfth grain doses every three hours will take the edge off the patient's nerves and it does somewhat limit peristalsis. It splints the intestines. But decreased peristalsis decreases pain, and the motion of traumatized parts is limited. Morphine used in this way does not promote but controls nausea. It does not lock up the bowels as is proved by gas constantly passing from the rectal tube. It does not depress, as witnessed by the cheerful appearance and countenances of most of our patients the following morning. We believe that by this method there is less of the drug used, and that small and frequently repeated doses do better work than a large dose at infrequent intervals. We have noticed by this plan of morphinization no unsettling of the stomach, no marked decrease of peristalsis, no increased thirst with a dry or too red tongue, nor has there been any marked diminution of urinary output, as shown by twenty-four hour totals on the daily charts. It is not desired to create the impression that some of our patients are not critically ill after operation, or that morphine is a cure-all, but we do believe that morphinization of the patient in this manner is a very essential part of our technic.

*The Rectal Tube.*—After the patient has been placed in her bed, an ordinary rubber rectal tube is immediately inserted by the nurse. It remains in position forty-eight hours and it is surprising how well its presence is borne and how much gas is passed. Occasionally, a patient will complain bitterly, but as a rule, the rectal irritation is *nil*, and, if present, may sometimes be controlled by injection through the tube of 2 ounces of olive oil which is rarely retained. It, however, exerts a soothing effect on the irritated mucosa.

*The Sandbags.*—Each sandbag is 12 × 6 inches and weighs 5 pounds. Two of these are placed on the patient's abdomen over the dressings and their positional retention secured by an abdominal binder which allows any change in the patients position without displacing the bags. Each bag is made of unbleached muslin, and after being filled, is divided, by stitching, into three separate sections so as not to allow all of the sand to shift to one end of the bag. This is an improvement on our first bags. The bag, therefore, retains its shape permanently, and when the patient is turned, the sand does not slide all over the inside of the bag. The filled bag is

also covered firmly with oil-cloth to insure better and longer wearing qualities, to prevent soiling of the muslin cover, and to prevent any discharges leaking into the sand. Sometimes only one is employed, especially if the patient is a thin subject or has a small abdomen. The bags compress the abdomen and also tend to immobilize it, and by their constant pressure control distention. Most patients for the first twenty-four hours object to the weight of the bags, but become accustomed to their presence after that period. While the majority openly express their relief when the bags are removed, yet many instances have been noted where the patient did not mind them, or was sorry when they were removed. Temperament plays an important part whether the patient objects or not, as is the case with the rectal tube. The bags are removed on the fourth day. After the removal of large tumors, their action is compensatory and gives relief by furnishing needed support and agreeable compression. The idea of the sandbag is that of Sampson, of Albany.

*Olive Oil.*—The essayist personally worked out this step in the technic in 1910 and 1911, later reporting his results before the State Medical Society. When the patient has recovered sufficiently from the anesthetic to understand the command to drink and before she has commenced to vomit (and this command to drink must be repeated several times), 2 ounces of olive oil are administered by mouth from an ordinary tea-cup. Persuasion is necessary. Usually, within five minutes after taking the oil, there is copious vomiting. As this is projectile in character, the nurse should stand ready with towel and a basin. The ejected stomach contents are composed mostly of a large amount of ether saturated mucus and some bile, and one vomiting attack usually concludes the performance. Rarely does a patient vomit more than once, and some do not vomit at all. If they do not, nausea rarely persists. If proper time of giving the oil is not adhered to, *i.e.*, if the oil is given after the patient has begun to vomit or is too conscious, either she will not take it, because of the taste or smell, or cannot take it because of her vomiting. It must be given at the right time or not at all. The nurse should be especially instructed and warned that the proper time of administration is the great factor in the usefulness of this step and that carelessness can nullify the whole proceeding. The removal of the ether saturated mucus is, in itself, of decided advantage in relieving nausea. One vomiting attack with its consequent strain on abdominal and pelvic sutures is better than repeated attacks. Constant retching and nausea do not make any patient comfortable. The oil relieves all this. While it is a universally established fact that in

those hospitals employing paid expert anesthetists postoperative nausea and vomiting are not so common as formerly, it is a fact that many patients are nauseated and vomit despite intelligent anesthesia. Undoubtedly, the same effect as from the oil can be gained by gastric lavage while the patient is on the table and before returning her to her bed, but lack of time in most operating rooms seems to prevent this from being universally employed.

Ashton relieves his patient's nausea by having a nurse administer oxygen until consciousness returns, when vinegar is substituted, the fumes being inhaled. He says that oxygen decreases shock, shortens the period of unconsciousness and in most cases, prevents nausea and vomiting. Vinegar, he adds, is the most efficient remedy to prevent nausea and vomiting. Lately we have been administering oxygen while the wound is being sutured, and we find that the patient reacts in forty-five to fifty minutes rather than in three to four hours. Further its happy effect is noted in the rise of blood pressure following operation, in contrast to the usual lowering, as noted in the analysis of our blood pressures, taken for the first twenty-four hours after operation. Also, in prolonged operative cases, it is our custom to administer the "*Axillary Sop*" of Lane, 1000 c.c. by hypodermoclysis into the axillary region, and given with a small needle and taking about forty-five minutes to inject. In these cases, we also notice a rise in blood pressure rather than a drop.

The routine of our technic is further amplified as follows: We insist on early rising, though not as radical as Boldt. Patients are up on the seventh day after the primary dressing. Late rising is regarded by us as a possible etiological factor of postoperative phlebitis. Crossen says that since most operators get their patients out of bed early, we do not see as much postoperative phlebitis. Since he adopted as a part of his routine, the plan of having his patients out of bed within a week, he has not had a case. Before that, 2 per cent. of his patients developed phlebitis.

*Postoperative Backache.*—A few years ago, investigation of this annoying sequel by personal letters and interviews brought out many theories, from different operators, as to its causation. It was said to be due to undue handling of the intestines and, especially, tugging on the mesentery; to the anesthetic; to renal congestion from prolonged anesthesia; to posture during the operation; to muscle cold due to chilling on the operating table; and to muscle relaxation with consequent straining of the sacroiliac synchondrosis. I had operating tables padded and warmed, operating room uncomfortably warm, oxygen given with the anesthetic, and still the patients complained



of the backache. The most generally accepted theory was that the backache was due to sacroiliac strain and a most effective treatment was devised, consisting of the administration of a migraine tablet, a pillow under the small of the back, and the pelvis strapped with two broad zinc-oxide adhesive straps. But it is interesting to note that since the introduction of the "four-step-routine," this form of backache has almost entirely disappeared.

All suspension cases have standing orders to be catheterized q.8.h. unless they void voluntarily within that period. Since the discussion before this Society on postoperative cystitis, during which the importance of using a soft catheter, instead of a glass one, was brought out, and also that the catheter should be thoroughly lubricated, I suggested a mixture of equal parts of 50 per cent. argyrol and glycerine, as a catheter lubricant and prophylactic. This has worked very well and our postoperative cystitis has appreciably diminished. If no suspension has been made, twelve-hour intervals are ordered, provided the patient cannot void. This tends to the least amount of instrumentation.

*Postoperative Catharsis.*—We have departed from the hard and fast rule of giving a cathartic on the third day, as we find by our method that many of our patients have spontaneous movements on the third day. Cathartics are not administered in many cases till the sixth day, when there is given a combination of 2 ounces of castor oil, and 1 dram each of the compound tincture of cardamom and paregoric, which is found to be very efficacious. Where the appendix has been removed, no cathartics nor enemas are given till after the fourth day at the very least. It was not so long ago that a case was reported, in which the appendix was removed, and because of later gas distention, on the second day, an enema was ordered. Later autopsy revealed most of the enema in the abdominal cavity. In all of our intestinal work, the bowels are not touched till the fourth or even sixth day, when Russian oil is administered.

Solid food is not given during the morphinization of the patient, as it was noticed that there was a tendency to gas formation and parietic stasis. In this line of parietic stasis with gas distention, we have, by the leukocyte count, differentiated between the stasis from slight intestinal paresis and that due to peritonitic involvement. The leukocyte count is a valuable guide in the presence of such conditions.

With the sandbag there has invariably been no parietic distention, and if there is distention when the bags are in position, it can nearly

always be ascribed to some peritoneal disturbance. We have in the sandbag a potent factor in differential diagnosis.

In conclusion, we might add that this "four-step-routine" is a composite idea, made up from suggestions of the whole staff. It is, at present, in universal use by all of us and giving marked satisfaction. It is certainly refreshing to visit the wards now and see our patients comfortable, able to turn, with a soft and compressible abdomen, and notable absence of postoperative pain. Hunger on the second day is often pronounced. I am speaking now of the majority of our patients with no postoperative sequelæ.

Recently we have added to our technic as a part of the routine, blood pressures before operation and then taken as follows: as soon after operation as convenient, every two hours for three takings, then next morning at ten o'clock, and again the following morning. Combined with this there is an estimation of the red cell count and hemoglobin estimate. Valuable information is given us as to the tone of the heart muscle. As was recently remarked, we do not speak of pulses any more, we speak of pulse pressures. A detailed report of these findings will be published at a later date by the House Gynecologist.

The staff of gynecological department of this institution feels, that after a careful and painstaking trial of this scheme of postoperative treatment, a technic has been perfected which has given us the best and most uniformly gratifying results, as compared with any former line of procedure.

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## ADENOMYOMA OF THE RECTOVAGINAL SEPTUM.\*

BY

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(With three illustrations.)

THE report of a case of adenomyoma of the rectovaginal septum at this time confirms the prediction which Cullen(1) made in the closing paragraph of his latest article on the subject, "that the literature of the near future will contain records of many such cases." Indeed I am indebted to Cullen's very illuminating exposition of the subject as well as to his examination of the specimen from the case here presented for the recognition of what had been to me an unusual and puzzling condition.

\* Read before the Obstetrical Society of Philadelphia, November 2, 1916.

The purpose of this paper is to place the topic before this Society for discussion, as well as to make record of an interesting and puzzling feature of the disease which has not appeared in any case previously reported.

The patient, Miss X, aged twenty-seven, was referred to me by Dr. Myer Solis-Cohen of Philadelphia, on February 11, 1916, with the following history: About two years before she was seized during her menstrual period with sudden, severe pain in the rectum which radiated down the left thigh to the knee. This recurred with each succeeding period and was associated with menorrhagia until she was subjected to operation on August 13, 1914. At this operation the uterus was dilated and curetted and an abdominal incision was made. In the left ovary was found a cyst about the size of an orange filled with old blood. There was a small quantity of similar bloody fluid free in the peritoneal cavity. Adhesions of the intestines to the pelvic structures required breaking up, after which the left tube and ovary and appendix was removed. A rubber drainage tube was inserted in the lower angle of the incision.

For three months after the operation she experienced slight relief in the symptoms, but by February, 1915, she was suffering severely and was again examined, and two small polypi attached to the posterior vaginal wall were found. These were removed under gas anesthesia, but their removal afforded no relief.

On July 23, 1915, several small polypi were again found in the same location as the previous ones. In addition to the menorrhagia she had noticed slight vaginal bleeding between the periods. She refused further examination or operative treatment until February 11, 1916, when I was requested to examine her. On close questioning I learned that the rectal pain began on the fourth day of each menstrual period and persisted for several days after the cessation of the flow which was profuse and of twelve to thirteen days' duration.

On vaginal palpation several small polypi were discovered attached to the posterior vaginal wall about 1 cm. below the vaginal portion of the cervix which was in no way connected with the tumor. They were soft, like an ordinary mucous polyp of the uterus, but somewhat more friable and bled from the slight traumatism of the examination. The area of vaginal wall to which the polypi were attached and the subjacent connective tissue were found indurated and thickened, imparting to the finger the sensation of a cellulitis of long standing. This indurated area was flattened and extended somewhat to each side into the base of the broad ligament. It could be more thoroughly outlined by a finger in the rectum and at the same time the mobility of the rectal mucous membrane over it was distinctly determined. The friability of the polypi, their tendency to bleed and their recurrence after the previous removal caused me to regard them as malignant. I was at a loss at first to account for either a benign or malignant polypoid growth in the posterior vaginal wall because such growths are, as a rule, of glandular origin and the

vaginal mucosa is usually devoid of glands. v. Preuschen(2), however, has discovered "that the vagina occasionally contains glands lined with tall cylindrical, or even ciliated epithelium, which may form the beginning of pathologic formations, such as cysts and benign or malignant adenomata." To such anomalous gland formation I ascribed the origin of the polypi which were found. The induration was considered to be a cellulitis resulting from either inflammatory or malignant infiltration of the rectovaginal septum.

In order to avoid an unnecessarily extensive operation with the certain loss of the uterus in a young, unmarried woman, I decided first to remove the polypi and subject them to histologic study. If they proved to be malignant a subsequent abdominal operation would be imperative.

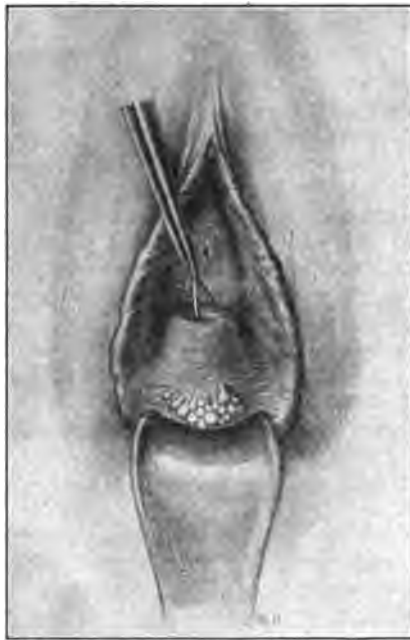


FIG. 1.—Adenomyoma of the rectovaginal septum, showing polypoid projections from upper part of the posterior vaginal wall.

*Operation.*—Under nitrous oxide-oxygen anesthesia the posterior vaginal wall was retracted, the cervix grasped in a double tenaculum and lifted upward. The polypoid area was well exposed and found to be separate from the portio vaginalis. The polypi were pinkish. They were removed with a curet, the bleeding surface cauterized with the actual cautery and the vagina tamponed with iodoform gauze. In spite of the precautions taken to produce hemostasis the patient suffered profuse bleeding from the vagina on the fifth and seventh day after the operation. It was controlled by more thorough tamponade. She left the hospital on the fourteenth day.

I did not examine the patient until August 30, 1916, although Dr. Cohen had reported from time to time that there was no apparent change in her condition. At the examination on August 30, I found that the indurated mass in the rectovaginal septum had increased somewhat in size since the operation and seemed to be attached to the supravaginal portion of the cervix. In addition I discovered another small polyp about one-half the size of a pea at the site of the previous ones. I removed it with my finger without difficulty. This polyp and sections from those previously removed, were submitted to Dr. Cullen for examination and I am indebted to him for the following report:



FIG. 2.—Adenomyoma of the rectovaginal septum. Section through one of the polypoid projections into the vagina showing (A) gland lined with columnar (uterine) epithelium and (B) a greatly dilated gland space filled with blood clot (C).

"On histological examination some of the polypoid projections are found to be covered over by many layers of squamous epithelium similar to that noted in the vaginal vault. The surface of others consists of typical granulation tissue. In other words, there has been an ulceration of some of the polypi. The stroma immediately underlying the surface consists of rather dense connective tissue. Deeper down are large numbers of glands, some very large and surrounded by a characteristic stroma, others small and lying in direct contact with the surrounding connective tissue. Some of the larger glands are filled with blood. The glands are of the type found in the body of the uterus and the general gland picture is that we often

note where gland hyperplasia exists. At a few points the stroma cells are swollen and remind one considerably of the interlacing of large cells noted in an early sarcoma. I do not, however, think that this feature is of the slightest significance."

"The polypoid mass that you sent me on September 20, 1916, is Gyn. No. 22482. On the surface of this polyp I failed to find any evidence of vaginal mucosa. There is, however, a granulating surface and opening on the surface are typical uterine glands. This section brings out another interesting feature. Here and there throughout the stroma are yellowish brown pigmented areas. At such points the stroma cells have taken up blood pigment clearly showing that there have been old hemorrhages."

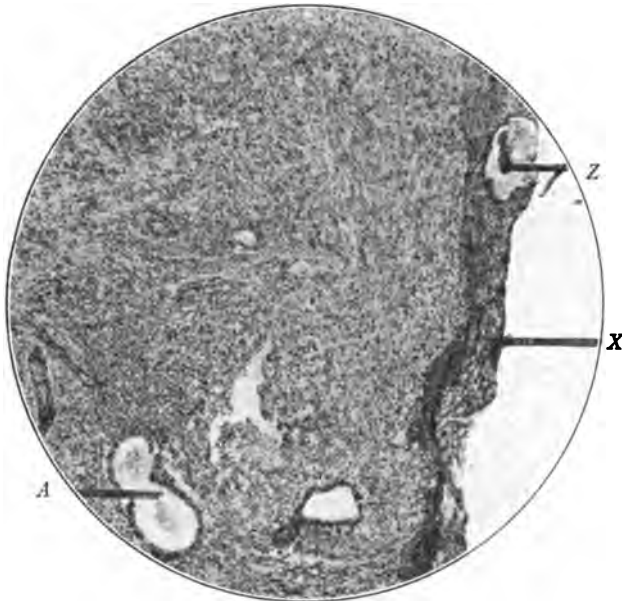


FIG. 3.—Adenomyoma of the rectovaginal septum. Section through one of the polypoid projections into the vagina, showing (X) covering of stratified, squamous epithelium undergoing necrosis at one area (Z). (A) A gland lined with columnar epithelium.

Seventeen authenticated and well described cases of adenomyoma of the rectovaginal septum have been reported, two by Lockyer(3), two by Clifford White(4), five by Cullen(1), two by Jessup(5), five by Stevens(6), and one by Nadal(7). All of them had features in common upon which a correct diagnosis could have been established. After our attention has once been definitely directed to the existence of this tumor as a pathologic entity and we understand its clinical manifestations, its diagnosis becomes comparatively simple.

It should be recognized early if its complete and safe removal is to be accomplished. While it lacks some of the characteristic features of truly malignant neoplasms, such as metastases and toxin production, its presence is nevertheless a serious menace to the life of the patient through its tendency to spread and produce dense adhesions, and in this way bring about partial or complete obstruction of the ureters, rectum or small intestine. In an attempt to draw a clinical and diagnostic picture of this disease I have tabulated the chief features of the previously reported cases. (See table at the end of article.)

*Incidence.*—Age between thirty and forty years, seven cases; between forty and fifty years, six cases.

Pregnancy had occurred in five of the eleven married women, no pregnancy recorded in the four single women.

*Symptoms.*—The chief symptoms are pain and menorrhagia.

*Pain.*—Two types are described; a grinding sensation in the lower abdomen and a distressing fullness or pressure in the rectum, aggravated during defecation. The latter is the more characteristic. Its relation to menstruation is usually distinct, being more pronounced at that time and much abated or even absent between the periods. An interesting as well as important point is the persistence of the painful pressure in the rectum for several days after the cessation of the menstrual flow. This feature of the pain, when present, should serve to distinguish it from ordinary dysmenorrhea. The exacerbation in the pain during the menstrual periods is ascribed to the swelling in the tumor which is claimed by Cullen to occur in adenomyoma "no matter where situated."

*Hemorrhage.*—In nearly all cases menorrhagia occurs. In some the bleeding exhibits itself as prolongation in time of the period, in others as excessive flow during a period of normal duration, and in still others as a combination of both features. Continuous or almost continuous vaginal hemorrhage is recorded in five of the seventeen cases. Spontaneous bleeding from the rectum was noted in only one instance and was ascribed to hemorrhoids.

*Physical Signs.*—The uniformity in the descriptions of the physical manifestations of the reported tumors is remarkable. It presents itself as a dense, indurated, nodular or flattened mass beneath the upper part of the posterior vaginal wall, to which it is usually closely adherent as well as the rectal wall. When of large size or situated high up the mass becomes fixed to the supravaginal cervix and is movable only with it. It spreads along the route of the pelvic connective tissue and involves the broad and uterosacral ligaments

extending even to the pelvic walls. In such cases the entire pelvic contents become fixed as in massive pelvic cellulitis. In only one case (12) were the nodules freely movable and not firmly attached to the surrounding organs. The tumor may be more distinctly outlined by the finger in the rectum than in the vagina. At the same time the mobility of the rectal mucous membrane over the mass can be determined. The rectal examination will also best make manifest the extent to which the tumor has penetrated the pelvic connective tissue.

In six cases (1, 2, 8, 11, 13, 17) the vaginal mucous membrane over the tumor showed some involvement as follows: It was puckered in two (11, 13), puckered and presented bluish points in two (2, 8).

In one instance (1) there was a teat-like projection in the right vaginal fornix and in another (17) a mass was attached to the posterior vaginal wall midway between the cervix and vulva. My case is the first one recorded in which the growth had developed an irregular polypoid mass projecting into the vaginal canal and in which the loss of the squamous epithelium resulted in ulceration and bleeding from the tumor itself. Difficulty in defecation, due to partial obstruction of the rectum, has been observed in some cases, but its occurrence is not as frequent as pain and menorrhagia.

*Malignancy.*—The extent to which the tumor involves the pelvic structures as demonstrated at operation, its continued growth after incomplete removal, the disaster which has resulted in two occasions from attempt at complete extirpation of the involved area bear witness to the menace which this tumor produces to the health and life of the patient.

Its malignancy resides in the certainty with which it spreads and produces dense adhesions that distort, obstruct or in other ways interfere with the function of the rectum, ureters, intestine and internal genital organs. In order to accomplish complete extirpation of the tumor resection of eight inches of the rectum was necessary in two cases (2, 7), partial resection of the anterior rectal wall was necessary in five other cases (3, 4, 6, 13, 15), and in some cases the ureters had to be dissected free from the tumor mass. Radical operations were performed in ten patients, two of whom died (6, 9). Death in one case resulted after the second operation and in the other after the third operation in which measures toward extirpation of the mass were instituted.

*Etiology.*—Consideration of the cause of adenomyoma of the rectovaginal septum leads into an interesting field of speculation



and conflicting theories. The theories of its etiology thus far advanced may be enumerated as follows:

First, it is derived from growth and canalization of groups of cells "which become detached from the hinder end of the Müllerian ducts, at the point where the fused ducts join the solid mass of cells from which the vagina is developed."

Second, it begins in glands lined with columnar and ciliated epithelium which Preuschen has described as of rare occurrence in the vaginal wall.

Third, it originates in the endometrium and subsequently penetrates the uterine wall, pushes into the rectovaginal septum and becomes detached from its source of origin. In one or two instances a direct connection between the tumor and the endometrium has been determined.

Fourth, the tumor may develop in anomalously located uterine mucosa, such as has been found in the ovary by Russell and near the outer surface of the cervix by Cullen.

#### SUMMARY.

1. Adenomyoma of the rectovaginal septum is an established pathologic entity.

2. It produces symptoms and physical manifestations which are characteristic and render its diagnosis comparatively easy.

3. While lacking some elements of malignancy, its presence is nevertheless a menace to the life of the patient.

4. The friable polypoid mass of adenomyomatous tissue projecting into the vaginal lumen in the case here presented, is a feature of the tumor which had not occurred in any of the cases previously reported.

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Case	Married or Single	Symptoms				Operation and Operative Findings	Remarks
		Pain	Hemorrhage	Physical Signs			
1 Lockyer, Case I		No symptoms recorded.		Teat-like projection in right vaginal fornix, close to cervix. No ulceration. No projection into rectum.	None.		
2 Lockyer, Case II	35 Married 18 yr. sterile.	Pain in rectum especially last three mos. worse at night. Difficult defecation and pain.	Menorrhagia last 12 mos. Excessive (last 3 mos. continuously). None from bowel.	Upper part of posterior vaginal wall one and one-half inches square puckered and presented bluish points. No ulceration. Portiovaginalis normal. Hard mass in rectovaginal septum fixed to supravaginal cervix and adherent to pelvic floor. Mass projected into rectal lumen. Rectal mucous membrane intact.	Uterus and appendages normal. Supravaginal cervix fixed to rectum beneath peritoneum. Left ureter adherent to mass. Wertheim hysterectomy. Resection of rectum. Left iliac sigmoidostomy. Result: recovery.		
3 Jessup, Case I.	36 Married, sterile.	Onset gradual. Dysmenorrhea and irregular flow for two years. Pain in lower abdomen. (No statement as to relation to menstruation or defecation.	Menorrhagia.	Somewhat globular mass between upper part of posterior vaginal wall, uterus, and rectum; more to right.	Abd. Section. Many pelvic adhesions. Mass extending from vesicovaginal junction posteriorly to rectum (right side). Complete hysterectomy. Excision of part of anterior rectal wall. Removal of pelvic lymph nodes. Rectal mucosa was not infiltrated. Lymph nodes showed only chronic inflammatory changes.		
4 Jessup, Case II	40 Married 2 children 17 and 13 yr.	Intermittent without relation to menstruation.	Rectal hemorrhage of recent onset. (hemorrhoids for 13 yr.)	Uterus large, cervix lacerated. A distinct hard mass between supravaginal cervix, posterior fornix and rectum (thought to be uterine fibroid). External and internal hemorrhoids. Proctoscopic. Intact rectal mucosa, but one that bled easily at site of tumor.	Abdominal section. A nodule 2 cm. in diameter between uterus and rectum attaching their muscular coats and causing contraction of overlying peritoneum. Hysterectomy: bilateral salpingo-oophorectomy, appendectomy. Removal of portion of anterior rectal wall.	The larger nodule consists in the main of typical myomatous tissue, etc. (Cullen, p. 7).	

Case	Married or Single	Symptoms				Remarks
		Pain	Hemorrhage	Physical Signs	Operation and Operative Findings	
5 Cullen, Case I.		No statement.	No statement.	Uterus retroverted and apparently adherent to rectum. Several rectal polypi.	Cauterization of rectal polypi. Abd. section. "Rectum adherent to the posterior surface of the uterus low down." Complete hysterectomy, bilateral salpingo-oophorectomy and then shelled out a myoma 1 cm. in diameter from left side of pelvic floor and another about 4 cm. in diameter from between rectum and vagina on left side.	
6 Cullen, Case II	Married 37	Great pain in lower abdomen after first operation.	Almost continuous hemorrhage from cervix beginning some time after first operation.	Thickening behind cervix and induration in both broad ligaments.	Two years previous had partial hysterectomy for fibroids removal of enlarged ovaries and a small portion of the rectum (on account of dense adhesions). D. & C. to check hemorrhage. Normal endometrium (on microscopic exam.) Abdominal section (a few days later) greater part of uterus still remained. Left broad ligament filled with a somewhat cystic mass about 6 cm. in diameter. Right broad ligament contained a similar mass. Left side mass removed as much as possible, a portion still adhered to rectum.	Pathologic report. Adenomyoma of uterus. "The said portions of cyst consisted of nonstriated muscle fibers arranged in whorls and of quantities of uterine glands embedded in their characteristicstroma. Died two weeks after operation.

Case	Married or Single	Symptoms				Remarks
		Pain	Hemorrhage	Physical Signs	Operation and Operative Findings	
7 Cullen, 30 Case III.	Single.	Intense pain for two days before and after each menstrual period	No record.	No record.	Abd. section. Many adhesions in the pelvis. Dense hard mass about 3 X 2 cm. between supra-vaginal cervix and rectum almost completely obstructing the latter. The rectal mucosa was intact. Complete hysterectomy, resection of about 8 inches of rectum.	
8 Cullen, 48 Case IV.	Married, sterile.	Severe grinding pain in lower part of pelvis and pressure in rectum. Onset sudden about 3 years before. The pain returns at the cessation of each menstrual flow and lasts 4 or 5 days, more severe at night and at times radiated down the right leg.	Menorrhagia on 2 occasions.	On first examination at onset 3 yr. before the mucous membrane of right vaginal fornix was bluish and puckered. A hard mass about size of a small hen's egg was found in recto-vaginal septum and bulged into rectum. About two-thirds of it were removed through the vagina, but in 20 months was again as large as at the time of the first examination.	First operation, partial removal of tumor through the vagina. Second operation (20 months later). Abdominal section. Mass 3 cm. long on the right side, adherent to rectum, vaginal wall and lateral wall of pelvis. Hysterectomy—removal of tumor after its dissection from rectal and vaginal walls.	

Case	Married or Single	Symptoms			Operation and Operative Findings	Remarks
		Pain	Hemorrhage	Physical Signs		
9 Cullen, Case V.	38 Single.	Several months duration. Pain in lower abdomen chiefly the men chiefly the region of the rectum, especially severe at menstrual period. Persistence of rectal pain after first operation and second operation.	Excessive menorrhagia. Persisted after second operation.	Irregular mass 5 to 6 cm. in diameter behind the uterus, more easily outlined through rectum than vagina. Had markedly increased at time of third operation 2½ yrs. after first operation.	First operation—Abdominal section. Mass like inflammatory thickening between cervix and uterus was broken up not removed. Second operation—22 months later. supravaginal hysterectomy, left salpingo-oophorectomy, resection right ovary. Third operation—8 months after second. Removal of remaining portion of right ovary, stump of cervix and tumor about size of a hen's egg. Dense adhesions found throughout pelvis.	Died 10 hours after third operation.
10 Clifford White, Case I.	36 Married, 1 pregnancy, abortion in 10th wk. 4 yr. before.	Pain in lower abdomen and back for 4 months.	Slight menorrhagia and brownish leukorrhea.	"About 2 cm. below the partio-vaginalis was found a hard nodular, fixed mass 3 cm. in diameter in rectovaginal septum. To the right of this was a larger mass which felt like enlarged glands. The right uterosacral fold was thickened and nodular. The rectal mucosa was freely movable over the mass. The vaginal wall between the mass and partio-vaginalis was apparently healthy."	No radical operation attempted. A small portion of the growth was removed for study through incision in the vaginal wall over the mass.	

Case	Married or Single	Symptoms				Remarks
		Pain	Hemorrhage	Physical Signs	Operation and Operative Findings	
11 Clifford White's Case II.	35 Single.	For 2 years pain in back, increased during and after menstruation. Painful defecation and constipation.	Menorrhagia.	Behind and to left of upper part of posterior vaginal wall was a dense tumor about the size of a hen's egg in rectovaginal septum. Vaginal mucosa thickened but not ulcerated. Rectal mucosa freely movable. Second examination 4 months later, growth increased in size, had invaded rectal mucous membrane which was thickened, warty, adherent, but not ulcerated.	No radical operation. Removal of portion of growth for study through vaginal incision.	
12 Steven's Case I.	Single.	Dysmenorrhea.	Menorrhagia.	Two small nodules beneath upper part of posterior vaginal wall. They were freely movable and not attached to uterus, rectum or peritoneum.	Removal of tumors through vaginal incision.	
13 Steven's Case II.	Married 6 yrs. at onset of sterility.	Dysmenorrhea. Abdominal pain at onset of menstruation.	Menorrhagia.	Nodular mass one-half size of a walnut fixed to posterior aspect of supravaginal cervix, closely adherent vaginal to mucous membrane and movable only with the cervix. Vaginal wall somewhat puckered over the growth.	Removal of tumor through vaginal incision. Partial resection of vaginal wall and of muscular wall of rectum to which growth was attached.	

Case	Married or Single	Symptoms				Remarks
		Pain	Hemorrhage	Physical Signs	Operation and Operative Findings	
14 Steven's 42 Case III.	Married, sterile.		Menstruation regular but flow excessive for two or three days.	Small hard growth attached to posterior surface of cervix and vaginal wall. Movable only with the cervix. Vaginal mu- cous membrane movable over growth.	Curetment of uterus, removal of normal mucous membrane. Re- moval of tumor, a portion of mus- cular wall of rectum and adherent peritoneum through vaginal inci- sion.	
15 Steven's 43 Case IV.	Married, 3 chil- dren.	Complained of something pro- truding at the vulva.	Irregular at times, continu- ous profuse vagi- nal hemorrhage for 3 years.	The protrusion was a cyst of the posterior-lateral wall of the vagina larger than a hen's egg. Uterus enlarged and nodular from fibroids. A dense indis- tended mass behind cervix in rectovaginal septum which was taken for a cervical fibroid.	Abdominal section. Hysterectomy. Rectum was found drawn up and attached to the mass back of the cervix and resection of the an- terior rectal wall was done.	
16 Steven's 42 Case V.	Married 2 chil- dren.	No statement.	Menorrhagia for several years; continuous uter- ine hemorrhage for last 4 months.	Uterus enlarged and retroverted. Growth back of supravaginal cervix discovered during opera- tion.	Abdominal section. Pan-hysterec- tomy. "A mass was felt low down at the junction of the cervix and vagina, over which the peri- toneum was puckered and cicatri- cial looking."	
17 Nadal 45 Case I.	Married, 1 preg- nancy at 24 yr.	Pain in left iliac and hip-capri- cious; intermit- tent; coitus painless.	No loss of blood except normal amount at men- strual period.	On posterior vaginal wall about midway between vulva and uterus hard, nodular, irregular mass 2 cm. by 6 mm. sessile closely adherent to vaginal wall. In no way attached to cervix.	Operation excision of tumor through vagina.	Recovery.

## IMPERFORATE HYMEN; LARGE SEROCOLPOS IN A CHILD.\*

BY

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ATRESIA of the hymen, with the consequent formation of a hematocolpos, is a fairly common occurrence. Serocolpos, the distention of the vagina by serous fluid of nonmenstrual origin so that it forms a large tumor, is an unusual condition. Judging by the absence of reports in the literature it must be exceedingly rare. A careful search of the literature of the last ten years failed to reveal a single case.

The text-books as a rule mention the subject casually without citing any specific instances. Thus in one of the most recent American books (Graves' "Gynecology," W. B. Saunders Co., 1916) we find this statement: "After birth the uterus usually remains inactive until puberty, so that postnatal acquired atresia does not produce symptoms until that time, although a few cases have been reported where nonhemorrhagic secretions have collected behind the closure and required attention before the onset of menstruation."

The history of the case I desire to bring to your attention is as follows:

Eva I., twelve years old, admitted to the service of Dr. H. N. Vineberg at Mount Sinai Hospital, July 30, 1916. Surgical number 165579. Chief complaints: difficulty in urination, enlargement of abdomen. Family history negative. Past history: Tonsillectomy one year ago. Menses not yet begun. Present illness: Eight days previous to admission patient was unable to urinate. A physician was called, and she was catheterized. At this time the child's attention was directed to the presence of a mass in the lower abdomen. Two days later she again had to be catheterized. She now voids in small quantities when up and about.

Examination: Well developed child of twelve. Temperature normal. Vulva infantile in type. Hymen imperforate and bulging markedly. Median hypogastric mass reaching up to the umbilicus, fluctuating, not tender. By rectal palpation the mass is found to

\* Reported to the New York Obstetrical Society, November 14, 1916.



bulge moderately into the lumen of the bowel; no irregularities of its surface made out. *No reduction in the size of the mass on emptying the bladder by catheter.*

Preoperative diagnosis: Hematocolpos.

Operation: Excision of hymen; thirty ounces of thin yellowish-white turbid fluid evacuated. The last ounce or so was mucinous in character. The finger found the vagina enormously dilated; at its summit an infantile uterus which dropped down into the pelvis after the evacuation of the fluid. Edges of hymen sutured with plain catgut. Examination of fluid: No pus cells present; few epithelial cells and amorphous material; smears and cultures negative. Final examination ten days after operation: edges of hymen healed; vagina admits one finger, shrunk down to almost normal size; cervix and uterus readily palpable in vault of vagina.

*Epicrisis.*—Here then was an imperforate hymen in a child of twelve; behind it an accumulation of thirty ounces of serous fluid distending the vagina until it formed an abdominal tumor reaching up to the umbilicus, and by its pressure upon the urethra and neck of the bladder leading to retention of urine!

As to the source of the accumulated fluid, it would seem that it must have originated in an excessive activity of the glands of the endometrium and endocervix. Any one who has had the opportunity to examine a large number of children with the endoscope before puberty knows how frequently these glands are active even at a very early age. Indeed, a profuse mucoid vaginal discharge, aside from any specific infection, is by no means uncommon in young children.

Whether the atresia was congenital or acquired is an open question; it might well have been either. Veit<sup>(1)</sup> states: "Without further malformation of the genital organs an atresia of the hymen can occur which gives rise to a collection of secretion, and such atresia leads to disturbances either immediately after birth or at any rate in the earliest years of life." He cites a number of cases all occurring in infancy, but none in later childhood. Thus Bunzel<sup>(2)</sup> noticed six hours after birth a swelling the size of a cherry between the labia of the infant; on the fifth day a discharge of mucous.

Hirschsprung, in a sixteen months' old child a swelling bulged out between the labia. Upon incision 5-6 c.c. of mucinous fluid was evacuated.

The case most similar to mine is that of Gramwell (quoted by Kelly<sup>(3)</sup>). This was in an infant one month old. The tumor mass filled the pelvis and lower abdomen almost to the umbilicus. Incision of the hymen allowed the escape of a small amount of pus followed by about 400 c.c. of lemon-colored fluid.

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- 67 WEST EIGHTY-NINTH STREET.

## DIFFUSE FIBROMATA OF THE OVARY.\*

BY

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(With five illustrations.)

It is usually stated that fibromas of the ovary comprise 2 per cent. of all tumors of that organ. A review of the literature reveals the lack of the consideration which the frequency of this condition would warrant. It is also quite probable that cases have been described as fibrosarcoma which were in reality fibromas. Because of the cellularity of this type of tumor as found in the ovary this confusion is very apt to occur unless there is the closest coöperation between surgeon and surgical pathologist.

Fibromas of the ovary are best classified according to their anatomical characteristics.

1. The diffuse fibromas in which the whole organ is involved with its shape retained.
2. The circumscribed fibromas in which only a portion of the ovarian stroma is involved.
3. The pedunculated fibroma which is extremely rare.

Inasmuch as the cases to be discussed fall under the first type, this paper will be limited to a discussion of diffuse fibromas of the ovary.

Hellman(1) states, "After a careful review of the literature most of which is unsatisfactory or unconvincing, although by no means unique, the condition before us is sufficiently rare to warrant the report of every case carefully studied." It has been my privilege to make an intensive study of four specimens in the Museum of Pathology at the Ohio State University.

Well authenticated cases can be found in the literature in patients from seventeen to seventy-two years of age. There are no well

\* From the Department of Surgery, the College of Medicine, the Ohio State University.

authenticated cases reported in patients during the premenstrual period. The ages at which these specimens were removed were twenty-five, thirty-six, fifty-five and fifty-nine years respectively.

Little may be complained of by the patients except a slow enlargement of the abdomen. The production of ascites may cause this enlargement to come on rather rapidly. Although this condition has been reported several times in the literature, it was not present in this series. Extensive hemorrhage into the new-growth through rupture of its newly formed blood-vessels results in a sudden enlarge-

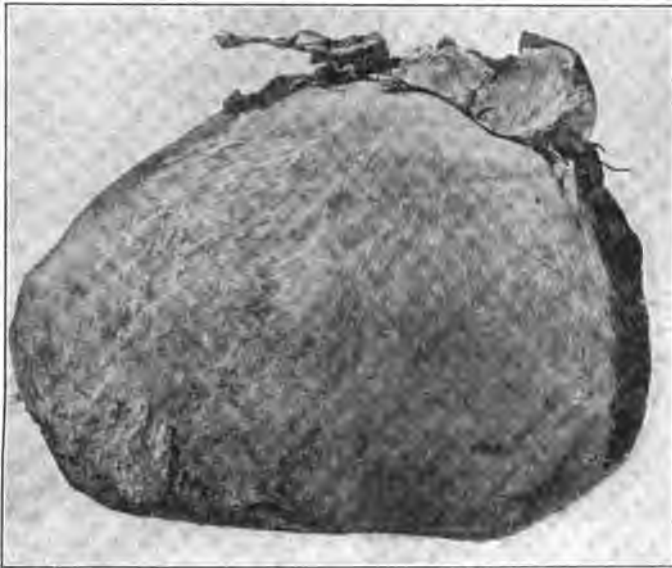


FIG. 1.—Diffuse fibroma section.

ment of the tumor. This had occurred in one of my specimens. All of the patients of this series sought medical advice because of the presence of a tumor of the lower abdomen.

Some type of pain is usually present but as a rule, it is not definitely localized. It may be referred to distant parts, as was present in one of this series. In this instance she sought medical advice because of intermittent pain in the left pelvis, whereas the tumor was in the right ovary. At operation no abnormality of the left pelvis was demonstrable. Frequently, however, a dragging sensation on the side of the tumor is present. Occasionally, a sharp pain is found directly over the tumor, in which event it is

due to a local peritonitis caused by mechanical irritation of the parietal peritoneum.

Urinary symptoms, when complained of may be either a retention or frequency. One case in this series presented retention, while another complained of frequency of urination.

As the tumor mass enlarges, obstinate constipation is frequently encountered as in one of my cases. The two patients who had not passed the menopause before the development of the tumor, presented but slight disturbances of menstruation. The catamenia of one (age twenty-five), had been prolonged seven days during the month

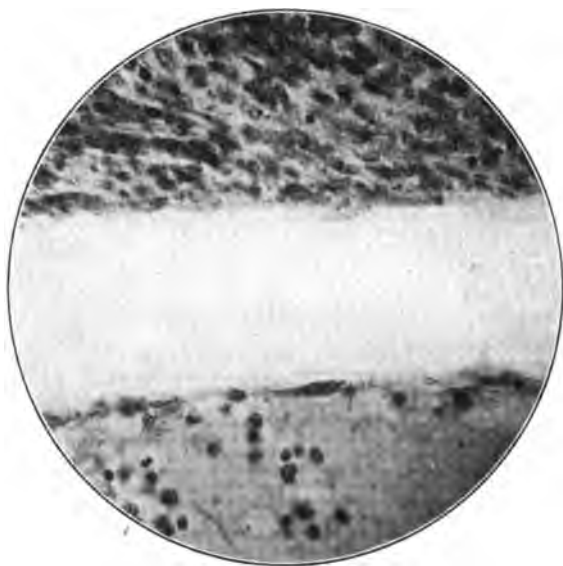


FIG. 2.—A small cyst in a fibroma. The lining epithelium has separated from the rest of the wall.

previous to the operation. The other (age thirty-six) had no disturbance of the flow whatever.

Examination of the patient will, as a rule, in most instances reveal the presence of a tumor. The mass is usually unilateral, hard, free, movable, and separate from the uterus. It may rarely, because of adhesions, become fixed.

Diffuse fibromas of the ovary vary in size from that slightly larger than the normal ovary to one rarely larger than that of a man's head.

There is a striking similarity in the gross picture of each of the cases in this series. They were all of practically the same size and

shape, averaging  $13 \times 13 \times 20$  cm. in their different diameters. The general contour of the ovary is retained as is the rule in this type of growth. In the absence of adhesions the surface is smooth with an occasional slight irregular elevation. The tumor is found in the normal position of the ovary. The Fallopian tube is not found stretched over its surface as is so common in other conditions but remains unchanged, except for a slight degree of thickening. These neoplasms reveal upon gross section a whitish glistening surface with interlacing bands and whorls of fibrous tissue. Edema gives the tissue a myxomatous appearance. Occasionally small

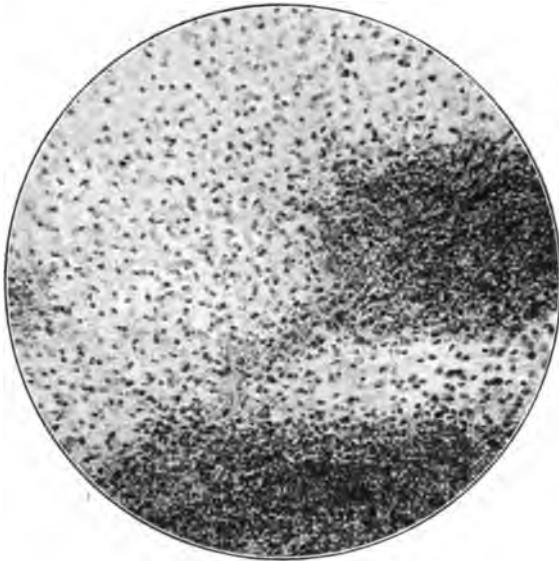


FIG. 3.—Recent small multiple hemorrhage into the tumor.

cysts are encountered as in one of my cases (Fig. 2), which are lined with a single layer of flattened epithelial cells.

The histological picture of these cases is also quite similar. Variations are quite as marked in different areas of the same, as in the different tumors. The tumor cell is a fibroblast. It presents the characteristic spindle-shaped nucleus with rounded extremities and a rather generous amount of chromatin for this type of cell. At times a tendency is exhibited by these cells to form into groups or bundles. Since the ovarian stroma embodies the "physiological prototype" of sarcoma, it is essential that these tumors are carefully studied before a diagnosis is made. While fibromas present,

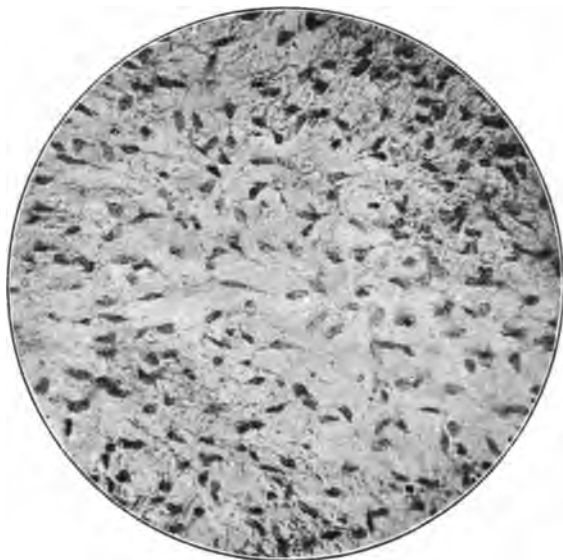


FIG. 4.—An edematous area in the tumor.

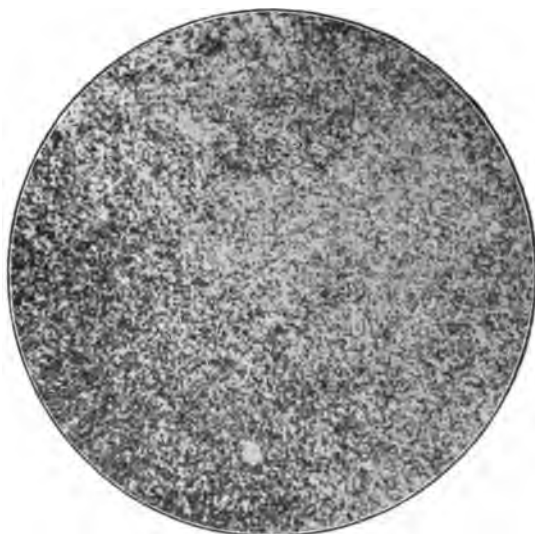


FIG. 5.—To show the cellularity of these tumors.

as a rule, a moderate blood supply, specimen 1756 was richly endowed and contained throughout hemorrhagic areas. A consideration of blood-vessels alone is not sufficient for differentiation of the tumors. The lack of differentiation upon the part of the tumor cells and the presence of mitotic figures in them serve as important criteria for a diagnosis of fibrosarcoma. In the case of spindle-cell sarcoma further aid in differentiation can be made by considering the gross specimen which exhibits infiltration into its attachments. Edema may or may not be present and when so is variable in degree, giving the appearance of myxomatous change as seen in similar conditions of the breast. Necrosis with its secondary changes may occur, but was not found in these cases.

While these tumors were being collected, there occurred a specimen of sarcoma of the ovary which apparently took its origin from a tumor of this type. The discomfort and general disturbances attendant upon the progressive enlargement of these tumors and the fact that they are true neoplasms, having the possibility of developing malignancy, warrants their prompt removal.

#### SUMMARY.

1. Diffuse fibromas of the ovary are more frequent in practice than in the literature.
2. They may occur at any age after puberty.
3. The symptoms are those of tumor of the uterine adnexa.
4. Because the normal structure of ovarian stroma is that of a very cellular connective tissue, a fibroma of this organ may be easily confused with fibrosarcoma.
5. On account of the size of these tumors and the possibility of them becoming sarcomatous, the treatment is prompt excision.

The writer would here express his thanks to Drs. W. J. Means, Yeatman Wardlow, H. E. Boucher, and C. D. Hoy for the use of their material, and to Dr. Jonathan Forman for assistance in the collection of the specimens and much valuable criticism. The illustrations are the work of Dr. C. C. Hugger.

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322 EAST STATE STREET.

## MYOMECTOMY IN PREGNANCY.\*

BY

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THE question of fibroid tumors of the uterus as a complication of pregnancy is a too intricate one to be presented in its entirety in one communication. My purpose is to present very briefly but one phase of the subject, myomectomy, and to report several cases.

Very few cases of fibroid of the uterus call for surgical interference during pregnancy, labor or puerperium. At times, however, they are a most serious complication of these three processes. The method of surgical attack when indicated must be determined in the individual case. Myomectomy in the selected case is a valuable surgical procedure, if successfully performed it saves both the uterus and the pregnancy; it is, however, a major surgical operation and should be performed only when the indications are quite definite. Myomectomy in the nonpregnant woman has a mortality as high if not slightly higher than subtotal hysterectomy; the dangers in the operation being hemorrhage and infection. These two dangers are aggravated when the operation is done on a pregnant uterus. Added to these is the danger of abortion from the necessary traumatism to the uterus. If the operation is performed after the fifth month of pregnancy there is danger of rupture of the uterus if miscarriage occurs or when the pregnancy has gone to term and labor sets in.

Myomectomy should not be performed simply because a woman is pregnant and has a fibroid tumor of the uterus situated in an available site for removal.

The two cases that I have to report show in detail justifiable indications.

CASE I.—Patient of Dr. J. B. Admitted to St. Agnes Hospital early in the present year. Primipara; age twenty-eight years; six months pregnant. For the past three months has had pain in the left inguinal region. As pregnancy advanced the pain increased in severity and at the present time she states that it is unbearable, and it is necessary to give opiates to afford her any relief. She also complains of pain in the back, rectum and bladder. The pain

\* Read before the Obstetrical Society of Philadelphia, October, 1916.



is described as if she had a great pressure in the pelvis. The bladder is irritable and urination frequent. She also has frequent desire to defecate but never feels that the rectum entirely empties itself. She is quite disturbed about her condition.

Examination showed a uterus pregnant at the sixth month. The cervix was displaced to the right and was at a higher level than normal. To the right of the uterus was felt a hard, elastic, spherical, fixed mass, the size of a grape-fruit, entirely filling the right side of the pelvis. A diagnosis of intraligamentous fibroid of uterus complicating pregnancy was made with a reservation. On account of the elasticity the question of a cyst with fluid under great pressure was considered.

On account of the severity of the pain, the patient's general condition and in part on account of the lateral displacement of the uterus, operation was advised and accepted. At operation an intraligamentous fibroid the size of a small grape-fruit was found on the right side. The growth extended in front of the uterus and impinged on the bladder. It also extended posteriorly and pressed on the rectum. There was nothing else abnormal in the pelvis. The tumor was attached to the uterus on its right posterior lateral wall. The broad ligament was opened, the tumor shelled out and cut away from the uterine attachment, the wound in the uterus being about 3 inches in length. The wound in the uterus was closed with interrupted catgut sutures and the broad ligament closed with a continuous suture. The bleeding during the operation was negligible.

Before operation the patient received morphia, gr.  $\frac{1}{4}$  and scopolamin, gr.  $\frac{1}{100}$ . After operation, in addition to the routine post-operation treatment, she received sufficient Morphine to make her sleep the best part of the first twenty-four hours. Subsequently, she was given Opium suppositories. No attempt was made to move the bowels until the third day; then an injection of glycerine and olive oil, each 1 ounce, was injected into the rectum. She made a good recovery and left the hospital in two weeks. At no time while she was in the hospital did she show any evidence of painful uterine contractions.

Pregnancy progressed normally and she was delivered at term after a normal labor of a living child.

CASE II.—Patient of Dr. C. H., St. Agnes Hospital. Primipara; five months pregnant. Except for usual symptoms, pregnancy progressed normally until the morning of her admission to the hospital. Early in the morning of that day she was seized with sudden and agonizing pain on the right side. She fell over unconscious and was in a state of profound shock when her physician first saw her. She was sent to the hospital and when she reached there and had rallied somewhat from the shock, it was found that she had a profuse bloody vaginal discharge. On account of the history of pregnancy and the character of the pain, loss of consciousness and shock, her physician without making an internal examination, made the justifiable diagnosis of ruptured advanced extrauterine pregnancy. The question of rupture of the uterus was considered.

On examination we found a uterus symmetrically enlarged to correspond to the fifth month of pregnancy. High up on the right side, a round mass the size of an orange, was felt. The diagnosis was made of uterine pregnancy at five months complicated by a pelvic tumor with acute torsion of the pedicle. Operation was advised and accepted. After the patient had rallied sufficiently from the shock which in our judgment justified operation, the abdomen was opened. A fibroid of the uterus, the size of an orange attached to the right lateral aspect of the fundus, was found. The tumor was attached to the fundus by a pedicle 2 inches broad at the base which narrowed as it approached the tumor. The pedicle had made a complete twist. The tumor was black and was apparently becoming gangrenous. A moderate amount of fluid was found in the abdomen but no free blood. The tumor was removed by cutting the base of the pedicle out of the uterine wall. This left a wound 2 inches long and about one-quarter of an inch deep. The wound was closed with interrupted sutures of catgut and the peritoneal covering of the uterus closed with a running suture of fine chromic gut.

On account of the free vaginal bleeding we fully expected this patient to miscarry. She received morphia, gr.  $\frac{1}{4}$  and scopolamin, gr.  $\frac{1}{100}$  before operation and was kept under the influence of morphia for twenty-four hours. She was then given opium suppositories at frequent intervals until the bleeding stopped and there was no further indication of uterine irritability. She made a good recovery from the operation and left the hospital in two weeks. Pregnancy progressed normally and she was delivered at term after an easy labor of a living child.

In both these cases the indications were clear and fortunately both resulted favorably for the mothers and the babies.

113 SOUTH TWENTIETH STREET.

## WHEN TO USE THE CURET IN INFECTED ABORTIONS.\*

BY

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THE selection of the method of treatment in an infected abortion, depends upon the following factors; the period of gestation, the condition of the cervix, the amount of hemorrhage, and the presence or absence of sepsis. In the clean cases, therefore, after securing free cervical dilation, complete evacuation of the uterus by means of the curet, forceps and finger, under a strict aseptic surgical technic, and the firm retraction of that organ, will leave the woman in the ideal condition to avoid complicating morbidity, provided she is not the subject of a gonorrheal endocervicitis at the time of the miscarriage. However, the majority of abortions that are seen in practice, both in the hospital and on the outside, are not primarily clean, in that they have been examined or packed through *an unprepared vulvo-vaginal orifice*. In our clinic we have shown this to be a fact by taking routine cultures from the interior of the vagina and uterus. So frequently has the presence of pathogenic bacteria in the uterus been followed with a resulting morbidity, as demonstrated in parametrial exudates, when the uterus was routinely emptied by the curet or forceps without consideration of the contained bacteria, that for several years we have let all incomplete abortions absolutely alone, and not entered the uterus with finger or instrument, providing the position of the uterus was such as to secure proper drainage, and the hemorrhage controllable. Our results, as have been previously reported, showed a most amazing decrease in both mortality and morbidity. These patients spontaneously expelled the uterine contents, the bleeding ceased, the temperature dropped to and remained normal, and these women were discharged from the hospital without parametric involvement. In our follow-up system, however, we have found that these patients complained of menorrhagia, sometimes very severe, for several periods after their discharge from the hospital. In our later work this sequel of miscarriage has been corrected by modifying our routine.

\* Read before the New York Academy of Medicine, November 28, 1916.

For years, as we have already stated, we have considered that *curettage of an incomplete abortion, which is presumably infected, is an unsafe procedure*, as by the use of the curet, we break through the protective leukocytic wall and spread the infection into the blood vessels and lymphatics of the uterus and into the parametrium. Clinical experience has confirmed this view. Therefore, we have divided our cases into those in which the abortion is begun and is completed in the hospital under the most careful surgical asepsis, and into those which began outside of the hospital and have been examined or packed one or more times through an unprepared introitus. These latter cases we consider as infected, as we have no way of knowing the exact amount of interference which has been resorted to. If the hemorrhage is negligible, they are treated by the expectant plan, namely, the patient is put to bed in the Fowler's position and an ice-bag placed over the uterus. If the bleeding is considerable a sterile gauze vaginal tampon is firmly introduced against the cervix. This usually controls the hemorrhage and causes the expulsion of portion of the secundines. Occasionally all bleeding ceases following the withdrawal of this pack, but as referred to above, the subsequent menstrual history of some of these women, has not been wholly satisfactory. The length of the period and the amount of blood lost has been distinctly abnormal. Several severe bleedings after the patient has left the hospital have caused us to modify our routine which at present is as follows: Now when a bleeding case is admitted a thorough vulvovaginal preparation is made and the interior of the uterus cultured. If this culture is returned negative, the uterine content is carefully evacuated after administering hypodermatically, an ampule of pituitrin. This evacuation is accomplished by the curet or placental forceps when the pregnancy is of eight weeks or under, and with the placental forceps and finger when it is past this period. Following the evacuation of the uterine content, which is relatively bloodless, if pituitrin has been used, the interior of the uterus is iodized, by packing with gauze soaked with tincture of iodine, *this pack is allowed to remain in place for twenty minutes*. The routine culture of the interior of the uterus has been illuminating in the fact that more than 60 per cent. have shown a pure culture of either the staphylococcus or streptococcus when such culture has been made from forty-eight hours to four days after the supposed miscarriage. This finding explains why a large number of incomplete abortions which were formerly subjected to routine curettage, have subsequently developed parametrial exudates, yet it must be admitted that several women from

whose uterus a positive culture of the streptococcus was obtained, were curetted as controls, without any local reaction in the uterus or parametrium. This does not disprove, however, the mass of clinical evidence as to the danger of spreading the cocci by opening avenues in the protective zone, but goes to show that the virulence of the streptococcus differs, as do the culture powers of the soil. As a result of these culture investigations, we conclude that where pathogenic organisms have been demonstrated in the uterus, we should employ the expectant plan of treatment until a culture from the interior of the uterus shows no organism to be present, when the cavity of the uterus may be curetted and carefully iodized. This we consider important, first, because complete evacuation of the uterus minimizes the blood loss at the succeeding periods; second, that placental remains favor the development of chorio-epithelioma, and finally that routine curettage and the microscopic examination of these scrapings give valuable information and may occasionally save the woman from one of the most malignant of degenerations. Hence, we lay down the dictum that all incomplete abortions with hemorrhage of varying degree, may be presumed to be infected. Culture of the interior of the uterus will prove or disprove this statement. If the cavity is sterile, prompt evacuation with the curet after the preliminary use of pituitrin, is the method of choice. If, however, pathogenic bacteria are present, intrauterine instrumentation should be avoided, until such time as the uterine cultures are sterile. Should the bleeding be copious, we would suggest the use of a vaginal tamponade, and the free exhibition of pituitrin, until the uterine culture shows sterile, when evacuation may be resorted to with safety.

287 CLINTON AVENUE.

## THE TREATMENT OF PAPILLOMATOUS GROWTHS OF THE OVARY AFTER THE POZZI METHOD.\*

BY

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OUR attention was called to this method by the reading of Pozzi's brochure, published in 1904, and also by a case in our service in the wards of the Long Island College Hospital, which afforded us an opportunity to study more closely, not only Pozzi's technic, but the views of other operators.

Briefly stated, Pozzi's plan, after section of the abdomen, is to remove as much of the papillomatous growth as possible, and if there is no ascites, not to drain. Should later observation of the case indicate a recurrence, the abdomen is to be opened a second time, as much of the recurrence removed as possible, and, if ascites, drain. Even a third or fourth section may be necessary; and with due attention to the steps of Pozzi's technic, recovery of the patient may be expected, provided there is no carcinomatous invasion. Even with this invasion, termed "generalization" by Pozzi, the life of the patient may be prolonged over a long period. He likens his technic to that employed in cases of tuberculous peritonitis.

The general opinion has been that simple papilloma is either malignant or semi-malignant, and that it is in some way allied to carcinoma. The so-called malignancy of the simple papilloma really refers to a group of symptoms which has nothing in common with the invading destructive properties of carcinoma, but is simply the result of its liability to cause extensive ascites, and to become distributed and implanted in the form of numerous new growths throughout the peritoneal cavity; in time, symptoms of pressure and obstruction occur, and nutrition is so far interfered with as to produce a condition closely resembling a cachexia.

Metastases from simple papilloma, in the sense in which they occur in carcinoma, have been noted only in the rarest instances. There is no way of distinguishing purely adenomatous growths (papillomata)

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from those which are carcinomatous, except by microscopical examination after removal. This cannot be done at time of operation. Nor can papilloma at time of operation be diagnosed when the papilloma is confined to the interior of an ovarian cyst. The practical conclusion to be drawn from this statement is, that a simple looking ovarian cyst is liable to be papillomatous, and even carcinomatous. An ovarian cyst, therefore, should be removed as soon as possible after being recognized, and all possible care taken not to soil the peritoneum, either by rupture of the cyst wall during enucleation, or during a vaginal examination. We should never approach any ovarian cyst with too much indifference.

That papilloma simplex has been cured by operative procedure is a fact chronicled by numerous observers. But it remained for Pozzi to formulate a definite proposition as to the operative treatment of these tumors, and to crystallize into a working formula the clinical evidence of his own experience. He was the first to establish a standard basis on which to work, and to lay down positive rules by which we might be guided when we encountered such tumors.

There are those of us who can recall occasions when the abdomen has been opened and diffuse papilloma of the ovaries found, with involvement of the uterus, peritoneum, and adjacent structures; operators were at once prone to close the abdomen. One of Pozzi's reported recoveries was just such a case, sent to him by a prominent New York gynecologist in 1903. The latter gentleman on opening the abdomen found a diffuse ovarian papilloma and promptly closed the incision. He referred the case to Pozzi, who operated, and the patient recovered. We have personally assisted at such cases and have seen the abdomen closed, the operator believing the case hopeless. In reviewing the literature, the opinion is unwillingly forced upon us, that had these operators sifted the facts as presented to them, by a critical review of cases reported by reputable authorities, and which information was theirs only for the reading, that their technic and ideas would have been materially modified. Facts were then at their disposal and command, to which they paid scant, or rather no attention; or, had entirely escaped their observation. And although Kelly in 1898, six years before the appearance of Pozzi's article, called attention to numerous well-recorded cases, authenticated as to dates, names of operators, and the findings in the pathological reports, until the publication of Pozzi's monograph, no definite nor well-established rules had been laid down as to the detailed and scientific treatment of these papillomatous ovarian cysts, innocent or malignant. We had abundance of clinical evi-

dence, some from American, but the majority from Continental surgeons, that operation *might* cure, but it remained for Pozzi to bring us out of the maze, and point out definite facts from which he drew the following conclusions:

1. Papillary tumors of the ovary (cystic or solid) must not always be considered malignant. Some never undergo malignant degeneration, and some do not recur after removal. Some relapse after a long period, but locally, without metastases.

2. A careful distinction must be made between carcinomatous generalization (which takes place through lymphatics and blood stream), and between simple grafts, which result from contact or from the growing on to the peritoneum of detached papillary vegetations of the ovary. This process is benign and can be compared to the grafting of papillomas and warts of the skin.

3. Some of these tumors undergo a malignant degeneration which is for a time limited, but can later extend all over the mass, and at last bring on a real generalization with cancerous metastases. Before this last period and at the outset of malignant transformation, it is impossible to discern it with the naked eye, and microscopical investigations are needed. The prognosis is always uncertain in operations of this kind before thorough pathological examination. Even this examination may lead to misrepresentation *if it has not been carried out all over the tumor*, for the degeneration can be limited to a very small part of the growth.

4. When positive symptoms of malignancy (cancerous cachexia or visceral metastases) are missing, one must act as if these tumors were benign and remove as large a portion as possible of the neoplasm. The disseminated growths or even small parts of the papillomatous tumor detached and lost in the peritoneal cavity may disappear; in other cases they will be the origin of local recurrence. But these relapses can be successfully treated by secondary operations.

5. The frequency of successive invasions of both ovaries by papillomatous tumors indicates that the adnexa should be removed on both sides, even if one is healthy, especially in women who are near the change of life. In young women, it would be better not to remove a nondiseased ovary.

6. In bilateral tumors, operative technic will be greatly improved by performing subtotal hysterectomy, according to the case.

7. Drainage is not necessary when cysts have no outside vegetations and when there is no ascites. In cases of ascites, it is better to drain for a while the peritoneal cavity. Incomplete removal or



even an exploratory section in inoperable cases is often accompanied by a diminution of the ascites and with general and local improvement.

Pozzi's propositions, then, boiled down, mean this: On sectioning an abdomen and finding papilloma simple or benign, without evidence of generalization, or as we would call it, carcinomatosis, excise the growths, removing everything; and if no ascites, nor vegetations, do not drain. If recurrence, reopen the abdomen, remove as much of the recurrent papilloma as possible, and if no ascites nor super-numerary vegetations, do not drain. One may reopen three or even four times, as shown by Pozzi's case reports, and recovery may follow. The interval between these successive reopenings is measured entirely by symptoms present, such as ascites, long-continued pain, emaciation, progressive weakness, and signs of the presence of the growth or its renewed increase, as demonstrated by abdominal examination and vaginal touch. There is no definite rule laid down as to any exact time to reopen. It may even be a year before it is necessary to section the patient again.

If, on opening the abdomen, there is generalization present, that is carcinoma, it can be recognized by the following signs: ascites, hard lardaceous masses, extensive adhesions, and large blood-vessels. In such cases, drain. Pozzi stipulates a Mikulicz handkerchief with three or four gauze inserts. Our own experience has taught us to substitute a large cigarette drain, or preferably a recurrent glass drainage tube in preference to the Mikulicz handkerchief, owing to the difficulty in removing the latter, which becomes extensively adherent to the intestines. Our own Mikulicz handkerchief could not be removed for nearly two weeks. When ascites reappears, repeat this procedure. Such cases may be carried along for some time. Pozzi reports one case carried along this way, and comfortably, too, for fourteen years, and thinks that this is not a discouraging result.

If a woman is near the menopause, remove everything. If she is young and unmarried, or young and married, and desirous of children, or is unmarried but with prospects of marriage, save one ovary and tube if not diseased, also the uterus, provided there is no generalization.

This last proposition of Pozzi's seems to us not only open to discussion, but to frank criticism, and would appear to be the one weak link in his chain of argument. For, the border line of innocence and malignity in such cases cannot always be determined, even at operation, a fact which Pozzi himself admits. The desire for children must be outweighed by the gravity of the pathology present,

and should not be catered to because of sentiment. Why incur the risk or take the chance of its not being malignant in face of our knowledge that it is not possible at operation to state whether we are dealing with simple papilloma or with one that is just on the border line? While we are all inclined to conservation and the avoidance of total castration of the female, this is no time to conserve.

We do not believe that many operators will share Pozzi's views on this proposition.

Microscopical examination of the removed tumor should be made in serial sections, as the malignant focus may be ever so small and located in one small portion of the ovary.

Enough has been said in this booklet of Pozzi's to fix our attention on a lesion which has been handled in a most hazy operative manner by most operators, with the possible exception of Kelly. We never till 1904 had any rules to guide us when we encountered papilloma. Pozzi has given us a set.

A critical review of the "Index Medicus," of many text-books on gynecology, and of late surgical publications, curiously enough, reveals that nothing is said regarding the treatment of papilloma. Mumford dismisses the subject with a paragraph of exactly nine lines. The other books discuss at length the pathology, but no rules are laid down telling us what to do. Kelly, on the other hand, as far back as 1898, gives us a most scientific exposition of the subject, quoting Olshausen, Pfannestiel and Williams. He says that numerous well-recorded cases show that papilloma of the ovaries have been removed, with numerous implanted papillomatous masses in the peritoneum and yet the patients have recovered and retained perfect health over a period of years without any increase in the growths left behind. But we found no mention by Kelly or by any other operator of the employment of the drainage method, or of successive reopenings of the abdomen, or of any recognized scheme telling us what to do when we met such cases. We were practically told that such cases were hopeless. Kelly is the only one who gave us any definite facts, and even he lays down no rules.

Pozzi's article, although written twelve years ago, seems to have escaped general and critical attention. His propositions are so clearly enunciated that it is worth our while to study them closely. Our operative work, if we operate at any future time on such a case, need not be done in the dark or by chance. For this, we should feel personally indebted to Pozzi.

242 HENRY STREET.

TRANSACTIONS OF THE  
AMERICAN ASSOCIATION OF OBSTETRI-  
CIANS AND GYNECOLOGISTS.

*Proceedings of the Twenty-ninth Annual Meeting Held at  
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*The President, HUGO O. PANTZER, M. D., in the Chair.*

TUBERCULOUS GLANDS OF THE MESENTERY.\*

BY

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THE frequency with which we have found enlarged mesenteric glands during the past few years in cases that have presented surgical symptoms aroused my interest as to the character of this glandular enlargement, and whether or not all of these enlargements were of tubercular origin.

The following cases are interesting, as showing the types of this condition and some of the complications which we may expect to find accompanying the presence of enlarged mesenteric glands.

CASE I.—W. M., male, aged sixteen years. Operated upon March 7, 1913. Preoperative diagnosis: Intestinal obstruction. Upon opening abdomen free bloody fluid in belly. Band of omentum found adherent to calcareous gland in mesentery of small intestine constricting and obstructing a large amount of transverse colon and coil of one foot or more of ileum. Mesentery was studded with calcareous glands from size of a pea to small marble. Appendix inflamed to a degree in keeping with general inflammatory condition present. Appendix removed. Constricting bands were freed relieving the obstruction. Uneventful recovery.

Report of pathologist of one of the glands which was removed. "Calcified tuberculous lymph gland of mesentery."

CASE II.—B. M., female, aged forty-five years. Operation March 11, 1913. Diagnosis: Intestinal obstruction. At operation free, bloody serum in belly. Small intestine distended down to within  $2\frac{1}{2}$  inches of cecum; beyond this it was collapsed and at this point on the small intestine was a broad band of omentum, which was adherent to a calcareous mesenteric gland, and which completely constricted and obstructed the gut. Bands were cut, relieving the obstruction. Patient died March 15 of general peritonitis, which was marked at time of operation.

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CASE III.—B. B., female, aged three years. Operation December 30, 1914. Intestinal obstruction. Patient *in extremis*. Operation matter of last resort. Glands in mesentery of small intestine large and hard, several being size of filberts. Two bands of omentum constricting intestine, one around the ileum at its junction with cecum, another around loop of small intestine. Both bands apparently constricted gut almost completely. Patient died on table before operation could be completed.

CASE IV.—A. S., male, aged nineteen years. This case in light of previous experience was operated upon with a diagnosis of tubercular mesenteric glands. History: Mother and father well. Several other children well and strong. No history of tuberculosis in the family anywhere that parents know of. Patient always well and unusually rugged up to present illness.

Present illness dates back six months when he began "running down;" complained of weakness and has gradually lost weight. Bowels usually constipated; for past few weeks has been worse; passing blood with bowel movements at times and finally became so weak that he had to stop work seven months ago. He has had no indigestion, gas or stomach trouble during the past few weeks but has had attacks of diarrhea coming on as soon as he took food. Widal examination, negative. Afternoon elevation of temperature.

Examination shows fairly well nourished young man; face rather flushed; abdomen somewhat sensitive around navel. By rectum feeling of glandular enlargement in pelvis.

Operation January 16, 1915. Upon opening abdomen stomach found normal, excepting pyloric end rather deeply injected. Pylorus seemed slightly thickened, but no signs of gastric or duodenal ulcer. Examination of intestines shows glands all through the mesentery greatly enlarged and hard. Two large glands removed for microscopical examination. Appendix found size of little finger, thick and tense. It was removed. Incision closed. Uneventful recovery.

Pathological examination of glands. Microscopic examination shows evidences of hemorrhagic inflammation in glands. No tubercles found in either the appendix or glands. No areas of caseation. Diagnosis: Chronic appendicitis, hemorrhagic inflammation of glands.

NOTE: Grossly, glands resemble tubercular glands. Tubercular stains in tissue negative.

CASE V.—C. H., female, aged thirty years. Operated upon February 6, 1915. Upon opening abdomen a three months pregnant uterus was found. Is well over to patient's right side. Right ovary and tube normal, but at left horn of uterus tube and ovary absent. Latter found on left side of pelvis attached to broad ligament entirely separated from the uterus with peritoneal bands extending from ovary and tube down over brim of pelvis, and which go down to side of uterus at about the junction of cervix with body. The mesentery of the small intestine is studded with tuberculous gland size of filbert. Appendix large, was removed. Uneventful recovery. Patient did not miscarry. Pathological report not found.

CASE VI.—E. D., female, aged eleven years. Operation December

22, 1915. Subacute appendicitis. Appendix found long and injected. Removed. The mesentery of small and large intestine was studded with enlarged glands, one of which was removed from mesocolon for examination. Uneventful recovery.

Pathological report of gland. Microscopic examination. Gland section shows a necrosis toward lumen and an increase of lymphoid cells. Appendix shows no evidence of tubercles. Diagnosis: Chronic inflammatory reaction in the mesenteric glands.

CASE VII.—G. S., male, aged fifty-four years. Operation February 4, 1916. Intestinal obstruction. At operation ileum found deeply injected and distended. Mesentery thick, infiltrated and studded with hard, small glands. Pelvic ileum matted together and adherent in pelvis. It was freed and brought up. Marked kinking found, two loops of gut being firmly adherent making complete obstruction, beyond which ileum is collapsed and normal. This condition was found about 10 inches from cecum. Mesentery so thick that could not bring up single loop of ileum, but necessitated three loops with the volvulus being delivered outside the abdomen. It was fastened to incision in lower angle, and above this the incision was closed. Condition diagnosed grossly as tuberculous peritonitis which was cause of volvulus. Patient died of pneumonia five days later.

CASE VIII.—R. W., female, aged five years. Seen in consultation March 10, 1916. History of acute appendicitis. Operation performed. Appendix found not grossly diseased, but mesentery at ileocecal juncture studded with ten or twelve enlarged glands, one of which was removed for examination.

Pathological report: Tuberculous mesenteric gland.

CASE IX.—H. T., male, aged twenty years. Operation September 15, 1916. Diagnosis: Acute appendicitis. Upon opening abdomen appendix found acutely inflamed, enlarged and bound down with peritoneal bands. Firm peritoneal bands constricting and holding down coil of ileum, making a definite obstruction, beyond which ileum is decidedly smaller in caliber and collapsed. Several glands in mesentery at ileocecal junction enlarged. Two coils of ileum adherent to mesentery making definite obstruction and which were freed. Further investigation showed glands studded all through mesentery of small intestine and not confined to ileocecal junction. Two glands were removed for examination.

Report of pathologist: Microscopical examination shows giant-cell formation to a slight extent, but an increase of lymphoid and plasma cells. No caseation present in any section. Definite attempt at tubercle formation in several sections. Diagnosis: Early tubercular process.

All of these cases presented surgical symptoms for which operation was performed, and at which the primary cause of trouble was found to be disease of the mesenteric glands.

A review of the literature shows that this condition has been recognized more particularly during the past five years, and the consensus

of opinion is that a great majority of these cases are tuberculous in character.

*Pathology.*—Inflammation of the lymph glands is a common condition and is usually brought about by infective material or toxins reaching them through the afferent lymphatics. The process may arise by extension of inflammation from the adjacent structures, more rarely it is a hematogenous infection. Lymphadenitis is invariably secondary to infection elsewhere. The glands nearest the point of entrance of the offending bacteria are generally affected, but those at some distance are quite commonly involved owing to the action of diffusible toxins. Acute lymphadenitis is simple or suppurative, the latter variety generally supervening upon the former. Suppurative lymphadenitis is due to infection with pyogenic organisms.

Microscopically the enlargement of the glands is found in the main to consist of a hyperplasia of the cellular elements as evidenced by nuclear division and increase in the number of cells. Not only are the lymph elements affected in this way, but the endothelial plates proliferate and are found in great numbers, often with several nuclei, more particularly in the lymph channels. This catarrh of the plates, as has been shown by Mallory, is a prominent feature in mesenteric glands and to some extent in others in typhoid fever.

Tuberculosis of the lymph glands in most cases is brought about by bacilli that reach them through afferent lymph vessels, more rarely from the blood stream. The glands generally affected are the cervical, peribronchial and mesenteric. In tuberculosis of the mesenteric glands the mucous membrane of the intestine may entirely escape. In some cases, possibly from secondary infection, the glands suppurate and may discharge their contents into the nearest cavity. Rupture into the vein or into the thoracic duct is the most potent of systemic miliary infection with tuberculosis. In long standing cases the glands become shrunken, more or less fibrosed, and may contain calcareous deposits.

Disease of the mesenteric glands may be either primary or secondary. If primary it is usually tuberculous. When secondarily involved, the glands may be tuberculous secondary to other tuberculous conditions, usually in the intestines themselves, or the glands may be secondarily enlarged from inflammation or septic processes elsewhere in the body.

We quite frequently find a few enlarged lymph-nodes in the mesentery at the ileocecal triangle in cases of acute or subacute appendicitis. In fact, the right lower quadrant of the abdomen is

usually the location in which this condition is most frequently found. This accounts for the fact that many of these cases have been operated upon with the diagnosis of appendicitis or some acute intestinal condition which presented a decidedly surgical appearance. Upon opening the abdomen possibly a rather harmless appendix is found and which is apparently not enough to account for symptoms. Further exploration in these cases reveals the mesentery studded with enlarged glands in various degrees of inflammation and varying in size from that of a pea to that of a filbert. In some cases we may find large retroperitoneal masses composed of several glands, the whole mass being from the size of an egg to that of an orange or even larger.

There are three reasons why the glands are most frequently found in the right lower quadrant:

1. The delay in the passage of food when it gets to the cecum.
2. The presence of organisms; they being much more numerous in the cecum than in the small intestine.
3. Presence of inflammation more frequent in this location.

Some cases have been proved tuberculous, and some are acute glandular inflammation associated with subacute infection of the appendix.

Lund, in writing of this condition in 1912, states that at that time he had seen about a dozen cases of tuberculous mesenteric glands with, or without, a chronic appendicitis. All his cases were in children, and he reports no cases of obstruction from bands adherent to inflamed glands, although he speaks of other cases in the literature of that time.

The diagnosis of this condition is usually not made before operation, as there are no distinctive symptoms due to the glandular enlargements *per se*. Symptoms are usually due to complications caused by the inflammation of the glands which are beginning to break down and in which nature, in trying to protect from a general infection, produces adhesions between omentum and the inflamed glands. Again, coils of intestine may be matted together in an effort to wall off the inflamed area, and we may find our obstruction due to this matting together of intestinal coils.

Physiology shows that if the mesenteric lymph nodes become diseased enough to block the entire flow of lymph, the protein and carbohydrate digestion and absorption will not be interfered with, but that at least 60 per cent. of the fat ingested will not be absorbed. The amount of interference with absorption of fat would naturally depend on the number, location of the diseased glands,

and how frequently they block the lymph ducts and their numerous anastomoses. Hence the significance of fat in the stools of tuberculous children.

Experiments have shown that the protein and carbohydrates are entirely taken up by the blood of the portal system, whereas the fats are absorbed by the lymphatics of the intestines. These mesenteric glands, as has been shown from cases reported, may subside or they may go on to calcareous degeneration or we may have caseation, secondary infection and breaking down of the glands in which case we may get a general tuberculous peritonitis, or we may have bands of omentum adherent to these suppurating glands which is nature's effort to wall off the suppurating focus. The bands may cause intestinal obstruction as they did in three of these cases reported. In one case the coils of intestines were adherent to inflamed glands and matted together causing obstruction.

The mesenteric glands are so frequently enlarged in children who present surgical symptoms that some writers have made the statement that tuberculous mesenteric glands are to be found in practically every child in which an abdominal operation is necessary. This statement would hardly hold, as we see many cases of intussusception in children in which there is no enlargement of mesenteric glands. It is, however, of undoubted frequency and many of these cases are probably of the bovine type of tuberculosis due to the fact that a great portion of a child's diet during its first two or three years is milk.

The bovine type seems to be much less harmful and not productive of symptoms, and probably accounts for the fact that the presence of enlarged glands in many cases is only discovered at autopsy; or it may be, as some writers hold, that these cases ultimately go on to complete recovery. Glands in adults are much more apt to be of tuberculous origin.

In many cases this enlargement of the glands undoubtedly precedes a condition of general tuberculous peritonitis, as illustrated by a case which Risley reports.

"Case of a boy, nine years old, with an acute belly of 48 hours' duration; temp. 101°, white cell count 9000. At operation the lower ileum was found adherent to the side of the ascending colon near the cecum and to a large ulcerated tuberculous gland in the mesentery. The peritoneum was smooth and not injected. Convalescence satisfactory, but slow until the 11th day when signs of further intestinal obstruction developed. Was again opened and a few fresh adhesions freed, and to the great surprise of the operator and his assistants, the whole peritoneum, both parietal and visceral, was found to be



thickly studded with tubercles, several of which were excised and reported to be tuberculous. Convalescence from that time on was uneventful. Patient gained weight."

This case is of interest, as the tuberculous peritonitis developed following the first operation. If it is a fact that tuberculous peritonitis follows this condition of enlarged glands, it would seem as if the opening of the abdomen might have some beneficial effect, as it does in those cases of tuberculous peritonitis; yet some writers claim that the admittance of air to the abdomen does not affect these early cases beneficially, as it does the cases of tuberculous peritonitis.

The treatment of this condition resolves itself into treatment of existing complications in most cases. In a case where the mesentery is studded with enlarged glands it would be an impossibility to remove all of them, but in a case where the only glandular enlargement is possibly at the ileocecal triangle, with only a few glands involved, it would be wise to remove these glands. As this condition is so frequently found in the right lower quadrant of the abdomen, and so often gives symptoms simulating appendicitis, it is well to keep in mind the possibility of this condition and at operation for appendicitis, in which we find the appendix not sufficiently diseased to account for symptoms, to look further and see if there are enlarged glands in the ileocecal triangle, or any obstruction in the small intestine due to inflamed mesenteric glands. The frequency with which we find this condition would argue against the small incision, or so-called gridiron incision, in cases of appendicitis and should make us particular in every case to investigate the ileum and be sure that it is free, and that there are no obstructions either from inflamed glands or peritoneal bands.

#### CONCLUSIONS.

1. Tuberculous mesenteric glands is often a primary disease of the true tuberculous type. The bovine type is undoubtedly present in many children without producing symptoms, the glands remaining quiescent, or having a tendency to subside.

2. It is impossible to make a correct diagnosis before operation, as a rule, unless there are palpable glands which may be felt through the abdominal wall, or by the finger in the rectum.

3. Tubercular mesenteric glands may be present without giving symptoms.

4. There are two clinical types.

- (a) A slightly progressing one generally with palpable glands.

- (b) An acute fulminating type most often simulating and impossible generally to differentiate from appendicitis.

5. Prognosis in subacute stage good without operation. In acute stage exploratory laparotomy should be done, but glands not removed unless definite indications either from adhesions, ulceration or size of mass producing pain or much obstruction.

6. Tuberculous glands of the mesentery may not present any symptoms until breaking down begins in the glands after which we get symptoms of tuberculous peritonitis, intestinal obstruction, or symptoms simulating acute appendicitis.

7. In children and young adults with history of right-sided abdominal pain, with or without palpable masses, inflamed mesenteric glands should always be considered as a possibility.

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#### DISCUSSION.

DR. HUGO O. PANTZER, Indianapolis.—Abdominal adenitis is scarcely mentioned in literature. Yet we may assume it to be present frequently as an attendant upon infection in the abdomen, as elsewhere in the body.

My attention was first emphatically called to this condition about fifteen years ago when I operated for a gangrenous cholecystitis following typhoid fever in a woman about fifty-five years of age. I found the abdomen full of bile. When I put my gauze sponge in the abdominal cavity I encountered several bodies. At first I thought they were gall-stones, but directly found that they were situated retroperitoneally and, hence, not such. I dug out several of them for examination, which the pathologist reported to be calcareous glands representing the last stages of an infectious disease. The history of the case, as investigated later, showed that the woman had pined and wasted a period of five years, between the ages of fourteen and nineteen, and then gradually resumed health. At the time of my operation her body was in good form. I take it most likely that she had had at the former period *tuberculosis of the abdomen* affecting

also the retroperitoneal glands, which disease had come to spontaneous recovery.

Ileocecal adenitis, as attending upon the ordinary infectious appendicitis, is commonly present, though hardly ever recognized by the average operator. In a paper before the Pan-American Medical Congress at San Francisco last year, I named this condition, for the purpose of emphasizing it, "ileocecal pharyngitis." The abdominal counterpart of glandular involvement closely resembles the cervical adenitis going with an acute throat disease.

DR. CHARLES L. BONIFIELD, Cincinnati.—I recall operating on a child some eight or ten years ago under the mistaken diagnosis of appendicitis, in which the trouble was an acute involvement of all the mesenteric glands. I did not remove any for examination, but I have no doubt they were tubercular. I closed the abdomen, and had the child treated for tuberculosis elsewhere. I have not heard about her condition recently, but at the end of two years the child was apparently in perfect health.

DR. E. GUSTAV ZINKE, Cincinnati.—About twenty years ago I operated upon a woman for supposed multiple uterine fibroids. The tumors could be plainly felt through the abdominal wall. Bimanual examination gave the impression they were attached to the uterus. To my surprise, on opening the cavity, I found the tumors were really nothing but enormously enlarged mesenteric glands. There were six or seven of them. The abdomen was closed and in due time the woman was sent home. Not hearing from this patient for six months, I called on her and found her washing clothes over a wash-tub. Upon inquiry she said, "I am all right; I never felt better in my life." An examination showed that the "tumors" had almost entirely disappeared. She was again examined a year later and not a trace of the tumor could be felt.

DR. GORDON K. DICKINSON, Jersey City.—The spirochetes and the tubercle bacillus get into the system and stay there as long as a patient lives. We have two tubercular germs, the bovine and human. The bovine gets into the system with milk, that is, it gains access to the intestinal tube and gets into the mesenteric glands. The human tubercle bacillus gains entrance through the respiratory tract, goes through the lung, leaves a little scar, passes into the glands of the hilum of the lung and poverty and unhygienic conditions bring it out through a lowering of the resistance of the patient. The tubercle bacillus of the bovine type is not normal to the human body. The glands become inflamed and enlarge, but after a while this passes away, and the germ dies. The tubercle bacillus of the human type remains a lifetime. It affects the lymphatics and other structures of the body. Tuberculosis of the mesenteric glands is practically always of the bovine type and is generally innocuous. If it becomes secondarily infected with pyogenic germs, or if we have the human type of tubercle bacillus, we have a secondary infection. The researches of Ghon, of Prague, and Hamburger, of Vienna, on numerous autopsies showed these two types of tubercle bacilli.

DR. JONES (closing).—I wish to thank the gentlemen for bringing out some interesting points in this discussion. If my paper is of any value, it is to emphasize the point that we do find this condition frequently in the right lower quadrant of the abdomen, particularly at the ileocecal junction. It is frequently the cause of ileus due to adhesions between the coils of ileum and inflamed glands. It has made me careful in every case in which I have opened the abdomen for appendix trouble to follow along the ileum from the cecum to see if there are any adhesions, and therein perhaps I have done more good as I have found those bands of adhesions about which Dr. Bainbridge has been telling us.

Within the last two or three months, possibly six or seven cases have come under my observation in which, had we removed the appendix and that alone, we would not have removed all of the pathology, and we would not have relieved the symptoms of these patients. It is important to realize we have tuberculosis of the mesenteric glands as the cause of some of our symptoms, and we should not be satisfied merely to remove the appendix, but go beyond that, cut these bands, free the ileum, and relieve the cause of the intestinal stasis in many of these cases.

Dr. Keefe will remember a case we had a few months ago. The patient gave a history of typical appendix trouble; we made a diagnosis of acute appendicitis and with our habit of following the ileum along to see if there were any adhesions or bands, we found that his ileum was held deeply in the pelvis to a large nodule which was a diverticulitis. It did not seem wise to more than free it. In freeing it we relieved the doctor of his symptoms. He has been comfortable since. I presume he will have to undergo an operation for diverticulitis. Had we not gone beyond the appendix and its immediate neighborhood, we would not have relieved all of his symptoms.

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## THE RELATION OF SO-CALLED ETHER PNEUMONIA TO PELVIC AND ABDOMINAL SURGERY.

BY

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ONE of the most difficult things about the science of medicine, which is yet in its developmental and formative stage, is that as scientific knowledge advances we have to unlearn so many things we have been taught. Theories and impressions received to-day have to be revised to-morrow by the discovery of new facts. To give up an idea or an impression that has been firmly implanted in our minds for years and readjust ourselves to changed conditions, based on new discoveries, is not always easy.

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For many years it was commonly taught that ether irritated the bronchi and was largely the cause of what was known as post-operative pneumonia. Such pneumonia was spoken of, and still is in most hospitals, as "ether pneumonia;" yet any surgeon in reviewing his experience may find many facts to disprove, and few or no reasons to prove, that ether is the cause of pneumonia after an operation. It is astonishing that this misconception, that ether has a harmful effect on the air passages, is so widespread. In reality, that this view is erroneous has long since been proven both clinically and experimentally.

Ether is administered in most hospitals several times every day, yet the condition known as ether pneumonia is a rare occurrence compared with the number of ether administrations given. If the pneumonia were the result of the ether, we ought to expect to have many cases every week. Again, if ether produced all the havoc with which it has been credited, the administration of it by the intratracheal method might almost come under the classification of criminal malpractice; yet we know that this method is safely practiced every day.

Rovsing has proved experimentally that, although ether does occasion increased secretion of the salivary glands of the mouth, the larynx and the trachea, the bronchi are not irritated at all, even when the animals are killed by administering ether through a tracheotomy tube. The only way, therefore, that ether can produce pneumonia is by the aspiration of the accumulated saliva in the throat, usually the result of technical error on the part of the anesthetist who should not allow the secretions to accumulate in the throat. Such secretions may, of course, be easily infected from the buccal cavity. It is quite possible under such circumstances that tonsillar infections, involvement of the nasal accessory sinuses, or the teeth may be one of the causes of postoperative pneumonia. Attention has frequently been called to the importance of the sanitation of the nose, throat and mouth before all operations.

Mikulicz, as far back as 1898, on account of the somewhat frequent occurrence of postoperative pneumonia, deserted ether and took up chloroform in the belief that the pneumonia was due to the irritating effect of the ether. To his great surprise, it appeared that the cases of chloroform narcosis were followed more frequently by pneumonia. He, therefore, decided to give up narcoses by inhalation entirely and, thereafter, employed local anesthesia in all operations, even in major operations. To his still greater surprise, the result was that the lung complications, far from decreasing, in-

creased to a considerable extent. He had twenty-seven cases of pneumonia in 114 laparotomies. This experience overthrew the old conception that postoperative pneumonia was due to inhalation narcosis.

Cunningham's very thorough work on the development of the lymphatics of the lung are both interesting and illuminating. He found that the lymphatics approach the lung from three different sources: From the two jugular sacs there are right and left lymphatic trunks, and from the retroperitoneal sac there are vessels which come up behind the diaphragm. The ducts which grow down from the neck meet in a plexus which surrounds the trachea. In the primitive lung the general pattern of the organ is very simple. It is obviously blocked off into large lobules by wide connective tissue septa. In the center of each lobule are the bronchus and the artery, and in the septa are the veins. At the hilum the tracheal lymphatics divide into three plexuses, one spreading on to the pleura, a second following the arteries, and a third the veins. The plexus which follows the veins grows rapidly to the pleura and spreads around the border of each primitive lobule, blocking off the pleura into polygonal areas. From this pattern the pleural lymphatics develop. At a much later stage the lymphatics grow down from the center of the lobule along the bronchi.

The lymphatics of the diaphragmatic surface of the pleura grow up behind the diaphragm from the retroperitoneal sac. This relation of the pleural lymphatics to the abdominal lymphatics is of the greatest importance in the consideration of the development of pleurisy and pneumonia following abdominal conditions of a septic nature. It is clearly seen, therefore, from this study of the development of the lymphatic system, how easily infections may travel from the pelvis or other parts of the abdominal cavity up through the retroperitoneal lymphatic system to the pleura, the base of the lung or the bronchi.

If we look upon pneumonia after an abdominal operation in the same light as we do upon the development of a subphrenic abscess after an appendectomy, we find they bear the same analogy to the point of original infection. The only difference is that in the one case the new focus of infection lands above the diaphragm and in the other below it, but both are brought about by the carrying of infection from the original source in the abdomen up through the lymphatics and veins by the retroperitoneal route. This idea is further strengthened by the fact that most postoperative pneumonias will show a mixed infection containing streptococci, colon bacilli or other

organisms in addition to pneumococci. On the other hand, it is often true that the appendix, the gall-bladder, the Fallopian tubes and the ovaries may be the seat of a pneumococcus infection.

Says Rovsing: "One curious fact should long ago have aroused the surgeon's suspicions, namely, that almost every so-called ether pneumonia manifested itself after a laparotomy, while it is extremely rare to find pneumonia following operations on the extremities, the thorax or the head. This occurrence is too unusual to pass by unnoticed. In the main, it is due to two circumstances: (1) That peritoneal infection is conveyed to the lungs partly by way of the lymph vessels and venous blood and partly by embolism. (2) That the sore-bellied patient after an abdominal operation does not dare cough or breathe deeply, for fear of causing himself pain. The result is imperfect aeration of the lung, and imperfect elimination of secretions. If, therefore, the patient is already suffering from bronchitis, or if an infection of the lung sets in, the development of a pneumonia is greatly favored and encouraged by the deficiency in expectoration and lung ventilation."

In this connection, it should be remembered as a matter of history, that the first employment of ether in medicine was as an inhalation remedy for certain lung diseases such as asthma, emphysema, bronchitis, etc. Rovsing is authority for the statement, which is borne out in the experience of others, that in certain badly afflicted lung patients who have to submit to operation, that ether is not only well tolerated but, in a good many cases, it seems to have a specific beneficial effect on such lung conditions.

It would seem proper to conclude, therefore, that cases of pneumonia following operations are not due to the ether. The term "ether pneumonia" should be discarded and forgotten. Post-operative pneumonia occurs with great rarity except after abdominal operations and is then, probably, due to an infection already existing in the bronchi or lungs at the time of operation, or to imperfect aeration and ventilation of the lungs by reason of the fear of taking deep breaths after a laparotomy; but in most cases the pneumonia is a *secondary infection of the lung* following a septic abdominal condition.

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#### DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City, N. J.—The conclusion of the author that all of these pneumonias are not directly due to the ether is true. In the investigation of the subject of anesthesia

in order to prepare a paper for one of our societies a little while ago, I found that ether produces a vascular stage of pneumonia. Those who go to the far north on voyages, where there are no germs, will pass through the vascular stages of bronchitis and pneumonia, but not to the full extent. In animals you get the vascular stage after ether and chloroform.

A doctor in my neighborhood goes to Crile's Clinic where they have as good anesthesia as in any part of the country, and patients who are given gas oxygen anesthesia, get a pneumonia, and are sick for five or six days. We have been using gas anesthesia very largely in our abdominal operations.

There are two or three factors to be considered in connection with the development of pneumonia following anesthesia, one of which is that germs on the tonsils back of the tongue and hanging there may be insufflated; the other is a slight drain from the abdominal cavity. Another thing which I have noticed is that the patient is usually transferred to a place where the air is poor and ventilation imperfect.

Some years ago I was taught, no matter how cold the weather, to put pillows under my patients, send them to bed covered around the chest, with warm water bags, open the windows widely, and induce a draught. Since then I have been following that plan my pneumonia cases have been reduced considerably.

DR. JOHN W. KEEFE, Providence, Rhode Island.—I believe that many of the pneumonias, as we call them, are decidedly different from what we call acute lobar pneumonia, and are due to an infection, and that infection is carried through the blood, but not directly through the mucous membrane of the bronchial tubes. I think very seldom is it carried through the lymphatics, but that most of our infections are carried through the blood.

We have what we call inhalation pneumonia, that is, the inhalation of some vomitus from the stomach, or some mucus collects in the throat, and we call that also pneumonia. We have a room where we send most of our severe cases after operation, whether they are cases of abdominal or of general surgery. I have noted many times in the winter, that we have a series of cases that we call ether pneumonia or bronchopneumonia, and several times, after refusing to send our patients to that particular room, until it was washed, aired and fumigated, we have had no further trouble. Whether there is something in the atmosphere they breathe in that particular room in the way of septic material floating about, I cannot say, but I do know that after thoroughly cleansing the room these cases of pneumonia have ceased.

I want to put on record an interesting case I had this last spring. It was a case of septic pneumonia following a tonsillectomy. In looking up the literature I found a report of twenty-eight cases of septic pneumonia reported from Mt. Sinai Hospital, New York. All of these cases of septic pneumonia followed tonsillectomy. A minor operation was performed on my patient, and within a week or so she was given ether and had her tonsils removed. Everything



seemed all right until the third day, when she developed a temperature and cough. She had three or four different foci in the lungs. She developed empyema, so that it became necessary to evacuate the pus in the pleural cavity and drain. She ultimately recovered. I feel the pneumonia was brought about in this case through the circulation; that probably some septic material entered the circulation during the tonsillectomy.

DR. CHANNING W. BARRETT, Chicago.—In the Cook County Hospital, Chicago, where thousands of operations are done in a year, at one time the internes gave the anesthetic, and during that time the percentage of morbidity and mortality from anesthesia apparently was large. In those days the internes took turns of one month in giving anesthetics. Last year a change was inaugurated, and now we get our anesthetists through a civil service examination which is open to nurses or doctors. Of the four who qualified at a recent examination, one was a lady physician who had had a good deal of experience, and three of them were nurses. Under that régime the number of pneumonias has decidedly decreased. Also we have this advantage, the patients are not sent back to the ward with other patients, they are not sent to the general ward, but to a separate recovery ward that has opportunity for a good deal of fresh air. We make free use of the partial Fowler position with the head of the bed elevated. Under that arrangement we have very little pneumonia.

I think it is very plain to all of us that pneumonia following operations does not come entirely from the anesthesia, but it does seem to me that prolonged anesthesia, choking anesthesia, the inhalation of septic material, etc., plays a very important part in the irritation which makes it possible for the germs to develop in the lungs.

DR. JAMES E. SADLIER, Poughkeepsie, N. Y.—I desire to express my appreciation of the paper presented by Doctor Darnell. My view of this question leads me to believe that while we do, occasionally, have an inhalation pneumonia following an improperly administered anesthetic, yet the cases constitute a relatively small number, and as suggested by Doctor Barrett, there is usually some other element that should be taken into consideration. In my own practice there are several factors I endeavor to avoid. In the first place, I aim never to operate an elective case where there is an acute inflammatory condition of the upper air passages. This is a marked factor in the avoidance of pneumonia. Secondly, it has always seemed to me that after these patients have been returned to bed, and are thoroughly conscious, each should be impressed with the slight danger of the pneumonia and be encouraged to breathe deeply, thereby giving the lungs needed exercise. The third point is the question of the clothing of the patient while in bed. This matter can be governed to better advantage in the smaller institution than it can be in the larger general hospitals, like the Cook County Hospital referred to by Dr. Barrett.

In my own practice, if a patient comes from the country in cold

weather, with a heavy undershirt on, and has been accustomed to wearing such a garment, we allow him to wear a similar garment after the operation. On the other hand, if he has been in the habit of wearing a light under-garment, he has the privilege of wearing the same kind after the operation. In other words, we allow our patients to wear the type of clothing to which they have been accustomed.

In my own institution where we can govern such matters, we have practically no pneumonia following anesthesia, but in general hospitals, where patients wear institution clothing we do occasionally have pneumonia following operative work.

DR. JAMES E. DAVIS, Detroit.—Microscopic sections of lung tissue from these cases show a focal involvement usually. Although there is a general involvement of the vascular interstices, there is a hyperemia or even an edema of this portion of the lung tissue, and here and there a definite focus of infection. It seems to me we see different types of cases, speaking from an etiological standpoint. An improperly prepared patient who comes to the operating table with probably some food in the stomach, is a case that will likely have a pneumonia from the entrance of food particles into the respiratory tract; while there are other cases that doubtless come from the lymphatics of the abdomen, and this leads me to say that it is interesting to note the conditions that govern the movement of lymph within the lymph vessels. Ordinarily in the extremities we do not have movement of the lymph, but in the lymphatics of the abdomen some of the larger vessels have a fairly constant movement of lymph. That movement of the lymph can be accelerated by acute conditions. For instance, the movement of the patient. Anything that will stimulate the patient, such as the giving of certain chemicals, will stimulate the movement of the lymph. Opium will usually retard that movement, and for this reason then it is a good thing to give opium after an operation to prevent the rapid movement of the lymph from the lymph vessels of the mesenteric system.

Dr. Barrett has spoken of elevation of the head. It does seem to me that it is an excellent procedure, if for no other reason than the hydrostatic advantage obtained for the lungs, and if we couple with that position the use of tap water in the rectum, the natural forces are augmented to counteract the movement of the lymph.

DR. ALBERT GOLDSPOHN, Chicago.—What I have heard here to-day rather confirms my previous opinion on this subject; that the pulmonary infection after operation is indirectly the result of ether as an anesthetic that has the pronounced tendency to produce over-secretion of the bronchial mucous membrane. I think it is not fair to say the anesthetist should not permit the accumulation of such mucus in the bronchi and pharynx, when ether is given alone without preliminary medication and to the degree of producing complete relaxation for any length of time. I do not believe that I could accomplish that feat, and I have not seen anyone else do it without getting sufficient mucus accumulated in the respiratory tract to cause some degree of asphyxia. This is quite uniformly

prevented by one or more doses of atropin, scopolamine or hyoscine given previously with morphine enough to fill another important indication. This I have always done for at least twenty-five years. And I do not remember having a case of postoperative pneumonia. Bronchitis yes; but nothing sufficient to cause a rise of temperature. And I am not a speedy operator. If the preliminary dose happens to have been forgotten, then I am badly handicapped. I am annoyed by the rattling of mucus in the trachea and in the mouth. I think it is cruel to allow a patient to endure such a thing when we can avoid it.

During all these years I likewise have needed the morphine to put my patient before operation into an indifferent attitude of mind, quite in unison with Crile's principles. I want to avoid the fear that I might have if I were going upon the operating table. I think there is much need for at least one preliminary dose, of one-eighth, or one-sixth, or one-fourth of a grain of morphine, with a proportionate amount of the other drug, to allay the patient's fears, to avoid the accumulation of the cruel and dangerous mucus, and to secure tranquil sleep for the patient for a couple of hours after operation, and thus eliminate the struggling, vomiting and noisiness of such patients when they awake from a purely ether anesthetic.

Theories of postoperative pulmonary infection by way of the blood or lymph channels seem rather remote in the presence of such a direct medium for carrying such an infection from the mouth into the bronchi as such an accumulation of asphyxiating mucus presents.

DR. FRANCIS REDER, St. Louis, Missouri.—The term ether pneumonia has been accepted by the profession in general and is used as such in the literature. Under such conditions it is not an easy matter to eliminate such a popular term. It is simply called ether pneumonia because it occurs in connection with the administration of ether. In addition to the possible causes that have been mentioned, there is another factor which is to a great extent responsible for the development of pneumonia. It is the change of temperature a patient is subjected to after the operation is finished and he or she is returned to the room. Such a patient often is in a state of perspiration. The journey from the operating room is usually along a hall whose temperature is much lower than that of the operating room. Often an elevator trip is taken with the patient to reach the bed. This does not better the chances for the patient. The blankets about the patient are frequently inadequate, often the feet are protruding unprotected. All this together with the patient's lowered resisting power seems to me to be a cause for pneumonia during the postoperative period.

DR. DARNALL (closing).—I wish to thank the fellows for their free and liberal discussion. There are one or two points I want to refer to briefly. Dr. Barrett and Dr. Reder both spoke of causes which lower the vitality of patients. If there is anything that lowers vitality we know that infection is more likely to take place.

Another thing is with reference to choking or imperfect anesthesia. As far as the accumulation of bronchial secretions and mucus and the rattling of mucus in the throat are concerned, a good many years

ago that obtained more than it does to-day. In those days we entrusted the administration of ether to the average interne, and we were more or less annoyed with it. Sometimes the secretions were sucked back into the bronchial tubes and larynx and infection occurred from above. Since ether has been more skilfully administered and has been preceded by morphine and atropin in our clinic, we rarely have any trouble with the secretions. Three cases of postoperative pneumonia have occurred in my experience. One case had a slight bronchitis when operated upon, and I have reason to think, so far as I can trace it out by analogy, the other two cases came from pelvic infection. One was a severe septic abortion, and the other was a severe case of obstruction of the bowel with pelvic abscess and appendicitis. Those are the three cases I have had in my experience.

Dr. Sadlier remarked about clothing. That is a valuable suggestion and I want to thank him for bringing it to our notice. A patient who comes into the hospital wearing thick-lined underwear, should not have a thin nightshirt put on him just after operation. Let him continue to keep his shirt on.

There are one or two things I want to drive home. I feel that postoperative pneumonia is a secondary infection and not an infection in the same sense that we speak of a lobar pneumonia. It may come from a dirty nose, bad tonsils or decayed teeth; it usually comes up the other way, by the retroperitoneal lymphatics and veins.

I would commend to every one of you Cunningham's article in the proceedings of the American Society of Anatomists which is a very thorough and scientific exposition of the development of the lymphatic system.

There is one other point I want to call attention to in connection with these pneumonias. With our classical lobar pneumonia we are taught that the condition clears up by crisis; but these so-called ether pneumonias do not clear up by crisis but by lysis. There is a gradual descent of the temperature curve, which is good evidence to my mind that it is not the same thing as an ordinary pneumonia.

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### HOSPITAL MANAGEMENT.\*

BY

GORDON K. DICKINSON, M. D.,

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IN the good old days the hospital patient was looked upon as "the direct representative of Christ," and spoken of as "Master of Lord," "Domini nostri pauperas," and "Our Lords the Sick." How different is the feeling concerning hospital inmates these days! How painful it is to those who love the poor and are interested

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in them, and in their struggles against the results of ignorance and fate to notice how the poverty stricken sick man or woman is viewed!

In the beginning of hospital work, the patient was the important consideration. Doors were wide open; all were welcomed, and the attending physicians and surgeons were held in exalted position. The efforts of the latter were respected; indeed, they were honored. Every endeavor was made to sustain them and their reputations, and to aid them with as efficient nursing as could be procured. Conditions then were as they should be. The head of the hospital was the patient and the patient's interested family with the board of managers as their servants. The hospital was constructed and maintained for them. Their interests were considered paramount, and to them was extended not only every effort toward relief, but cheerful surroundings and all that tended to drive from the mind home-cares, worries and stalled income.

But as time went on changes, necessarily, took place; and hospitals, the result of a benevolent feeling for the sick, developed into three distinct types: Those conducted by sisterhoods, municipalities, and private interests.

In the first, there is to-day perhaps the best representation of the true spirit of the hospital. As in the Bible, the Good Samaritan finds one who has been attacked by thieves, stops on his journey and at the risk of being attacked himself, stoops over to give comfort and relief to the injured, so do the sisters' hospitals seek out the poor and welcome them to their institutions without leading them to feel that they must contribute or be disturbed in mind.

The municipal hospital, born in politics and maintained by the public exchequer, always skimped in finances, with a medical staff not selected for efficiency, sending out nurses half-trained, seldom comes up to the high ideal of diagnostic and therapeutic efficiency, nor is it productive of that communal uplift which should be expected.

The other hospitals, inaugurated by philanthropic bodies, have sprung up like mushrooms anywhere, regardless of necessities, and are living a life very much according to their own ideals.

Thus it is seen that hospitals are not uniform, but conducted on most diverse ideas and plans. Whereas, the original notion was simply to care for the sick-poor in full sympathy, now changes are occurring which will materially modify them and their incentives, the present condition with these institutions being similar to that of surgery in the 70's.

As medicine has advanced and changed very largely from an art to a science, and as the patient in bed is a most important subject for the education of the profession, hospitals are rapidly developing into educational centers wherein the interns and nurses, as well as the attending and even the outside profession are enabled by the knowledge obtained to strengthen themselves in diagnosis, to offset false notions and wild beliefs, and to become more skilful in treatment.

The intern, now as a rule in his fifth year, needs the hospital for clinical instruction. In the past he was generally received as a first-class orderly. More recently, as a clerk, but now that the time has come when he is to be considered a student in a school, hospitals must awaken to their obligations to him.

Our institutions advertise for young women to come to their training schools. They give them a book. They ask them to recite. They tire them with ward work, and then forget to train them.

For fear of offending the public, many hospitals not only neglect to secure autopsies, but rather discourage them. They do not want to disturb those who are saddened by calamity, and yet it is through autopsies that we obtain the largest fund of knowledge and gain the most material for future work. This all-important institution, gradually developing in spite of indifference, should be divided into three sections: The professional side; the board of managers; and the superintendent.

The professional men deal with the sick and the disabled. They come to the bedside; they study their cases; they worry over what is best to do. They work in concert with the nurse, and in them is that conscious striving to help not only the patient but to help the institution help the patient. Their whole life is tied to their work and the hospital is an integral part of them. They represent very largely the Christian spirit which first instigated the formation of hospitals. They are allied by nature to the Good Samaritan who risked life and suffered discomfort to help the poor stranger. The nature of their work, the life they live, and the education they have obtained, naturally lead them to be democratic. Perhaps at times they are restive because of dogmas, rules and red-tape; but ever kindly in intent, easily led, and quick to reciprocate.

The board of managers, for the most part composed of those who know nothing of the hospital's workings, who spend most of their time in offices and business houses, meet perhaps once a month and discuss matters pertaining to an institution which they seldom,

if ever, visit. They know not the wards. They know not the attending staff, nor the nurses. They accept but one source of information as to hospital conditions, that is, the superintendent. Their duty should be to finance the institution, to see it regulated so that the public will be pleased and a kindly feeling engendered in the neighborhood. The work of the professional staff should be honored and the staff strengthened in every particular as to efficiency and institutional interest. Genius and talent should be sustained. Conditions should be permitted which would enable the clever one to develop and the clod, or the one who is a misfit, to be dropped.

Up until 1910 there were but few sanitarium. To-day they are sprouting up all over the country. The hospital to be successful must please the people as the sanitarium do. Thus much depends upon the superintendent. He occupies a position which has never been defined. He should be one who correlates and coöperates; whose mind is bent on harmony and the making of a happy family, with but one inflexible rule—that all who come and go shall be pleased.

In an investigation of the hospitals of the writer's State, he found as many types as hospitals. No two had the same notion as to what was best. None administered with a properly conceived idea as to a standard, and in every one more or less dissatisfaction, particularly within the medical staff existed. The very men whose abilities should be respected, the ones whose energies were given gratis daily, were the ones disturbed and allowed to be disturbed.

For some reason the medical profession seems to have a hoodoo. For some reason it does not receive the full respect and courtesy. Perhaps it is because of the fact that only recently the ranks were to a large extent filled by the father's sons, men who were failures at everything else and, in a year or two, received diplomas, signed and sealed, which put them on the public to do the best they could. It is these incompletely educated men who, even to-day, preponderate in the profession. But the medical colleges have had the courage to raise their standards, and to cut down their clientele. Fewer and better doctors are being turned out. In another five years, perhaps, every regularly graduated physician will have had as complete an education as may be obtained from schools. In another ten years the young doctor is baked over and has received the discipline of general practice. He will then be ready for appointment on a hospital staff. We unfortunates of the first-class, who have had to strive for the best even though incompletely educated

at the start, will be under "the low green tent." Then, perhaps, the profession filled with hundred per cent. educated men, will be honored and respected, and hospital staffs not tolerated and regulated by rules as now.

But what is to be the proper means for controlling this unhappy chaotic condition of to-day? If matters are allowed to proceed as they are, the majority of hospitals will be run dogmatically by boards of managers who fail to appreciate the proper ideals of a hospital. How can we expect it to be otherwise? What institution, what business concern is managed as our hospitals? How can one expect good results and perfect accord and harmony where so much depends upon personality, public interest and trust? In days past the manager of a concern would sit in a closed room. In progressive institutions of to-day the manager sits where the public may see him, where he may be approached and become acquainted with the people.

In many towns medical clubs have been formed; some limited in numbers, others not. These bring together the physicians of the community. This results in a better acquaintanceship, produces friendships, and leads the members to feel that the other fellow is not as unethical as they thought. So, with our hospitals, will it not be wise to amalgamate the three bodies? Will it not be best to place on the board of managers, every man of the attending staff, every man who goes to the bedside, who knows the hospital and his patients, who by reason of his general practice knows the community, and who has a large public influence; this would not only entitle him to serve on important committees, but one would exact him to study the hospital administration and predicaments. He would thus give to the board of managers a broad full interpretation of hospital affairs and undercurrents, so that matters may be acted upon wisely, that unnecessary rules and regulations may not be instituted, and that there may be a warm, cordial feeling in all departments at all times. In this way a proper education of the laity as to hospital needs would be accomplished. At the same time the physician would become interested in the administration of the institution and would receive a tutelage which has been denied him in the past and so prevented a proper amalgamation of interests.

But it is feared that even this will be too slow and ineffective now, because through the hypnotism of habit the medical man is looked upon as a disturber; consequently he should be eliminated from council bodies. True reform must come from without. Tendencies are already noted from that direction. The colleges feel the necessity



of keeping some control on the scholar in his fifth year while intern in an institution. They have a right to make some demand upon the hospital holding such intern; but are at a standstill, because they fail to comprehend how to raise the standards of a hospital.

The American Medical Association has started a movement for standardization of hospitals which will include administration. The State Medical Societies are making similar endeavors. The American College of Surgeons, through its efficient director, is also quietly working in the same direction. There is, however, another power more potent than all, but more unpleasant to consider; that is the State Legislatures. Shall we wait until the State demands that our hospitals be controlled by some central body? Shall we wait until the hospitals, like our schools, have a board dictating policies and methods and enquiring into results? Or shall we, the profession, take it upon ourselves to thoroughly investigate what hospitals are and what they should be? and, How the different factions correlate, and endeavor to find some one way to satisfy the professional requirements of the patients and those attending them? Would it not be well to have our large National Societies come together in all earnestness and attempt a solution of the problem? May the American Association of Obstetricians and Gynecologists initiate it.

280 MONTGOMERY STREET.

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## THE SURGEON'S RESPONSIBILITY TO THE ECONOMICS OF THE HOSPITAL.\*

BY

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"HOSPITALS are managed with a laxity that exhibits extravagance, waste and general economic inefficiency" is the verdict rendered by an eminent efficiency expert after he had made a survey and study of a large number of institutions. Regrettable as is this declaration, I am convinced that it truthfully tells the condition, and venture now to call attention to it prompted by a hope that in so doing an effort may be stimulated to at least partly correct the evil. Why inefficiency to such marked degree should be tolerated in a hospital, when if such existed in a bank or similar corporation would bring forth a vigorous protest from those interested may have an explanation,

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but certainly has no justification. It might be explained by the fact that there are no stockholders expecting pecuniary gain; or, that the directors are not held liable for the economic loss; or, as the dominating factors contribute their services gratuitously they are not so exacting; or that the managerial agents being multiple and sharing divisional directions, there is no one person upon whom is centered the responsibility. If these reasons should explain the existence of this undesirable state of affairs they yield no justification for it, and the further endurance of the customs producing the condition should be terminated.

There exists a mutual dependence between the surgeon and the hospital; and likewise the greater service of the one is proportionate to the higher quality of the other. Reference to the surgeon here is meant to include also the physician. How the hospital may be regarded in the community is greatly due to the character of the surgeon; the quality of the hospital reflects the surgeon's efforts and his value. Much, if not the greater part, of the responsibility for the success of the hospital, and, too, for a large proportion of the dissipation of its resources, rests upon the surgeon. The institution is constructed and maintained for the care of the sick: the direction for administering the needs comes from the surgeon. Laymen may form the governing board having to do with the financial administration; their work is to provide the means through which the needs as prescribed by the surgeon shall be applied. The surgeon is therefore the fundamental power. I am mindful of those familiar complaints too often listened to from the staff member, that "the medical staff has no voice or power in the direction of the hospital." How much these complaints evidence the enfeeblement of the complainer is obvious. The more we study this condition, more convincing is it that the managing board are receptive to, in fact seek, the counsel of the progressive surgeon. When complaints to the contrary are expressed it is evidence that the lights of the complainer have either been hidden under the bushel, or more often the lights are too dim to be seen.

He that provides the hod and the brick from which he moulds the walls of his own house knows well the cost of the material and the labor required. I have often thought if every surgeon had an apprenticeship in managing a hospital every expense of which he were obliged to pay himself, how much differently he would handle the assets of the institution he is supposed to serve. I am constantly impressed with the small percentage of our men that show evidence of any familiarity with the cost of articles which they prescribe, and

further, even to recognize in some a disdain for the thought that they should give consideration to the matter of expense. With a full realization of the first and paramount duty of the surgeon to conserve the comfort, protect the life and minimize the morbidity of his patient, his duty is but little less to conserve the economic use of the hospital's resources when such may be accomplished consistent with his best service to the patient.

Discipline is essential to secure the best services from the nurses and internes. Systematic schedules are defined for their observation and guidance, yet many surgeons have seemingly no regard for punctuality upon appointments at operations, or regularity for hospital visits. The waste of time of the nurses, internes, orderlies, and other helpers occasioned by the surgeon who is late at an operation, fails to secure his proper consideration. A half hour's delay means a loss for the combined forces waiting of a half day's individual service, for which the hospital pays. But that is not all it means. Such a delay has upset the working program of the institution by disturbing the day's subsequent schedule; and necessitates additional loss of time in gaining a readjustment. With rare exceptions the surgeon can methodize his visits that require the helping services of the nurses and internes, and certainly can arrange to be punctual at operations. It is well that he should not take from the hospital these hours of service. It is not only a waste, a useless dissipation of the resources, it is the taking of that which belongs to another. Is it honest?

It is my belief that those ordinarily performing the interne service have a desire to serve well the purposes of the institution. That there are individual exceptions among nurses, and internes, as well as among servants, there is no doubt, and yet the adverse influence of these bad-actors is increased or lessened in proportion to the general harmony and good spirit prevailing. It is within the power of the surgeon to maintain and promote such a spirit. It is his privilege, and likewise a duty, to stimulate enthusiasm for work among the nurses and internes. Discreetly discrediting the improper doings and the praising of meritorious work lies within his province and when exercised goes far to help the general good. By the general influence which he exerts upon those under his direction he becomes an economic asset or a liability to the institution.

Waste of supplies and the extravagant use of unnecessary or unduly expensive articles deserve to be deplored. To use piperazin at a cost of twelve dollars per ounce, when a salicylate costing fifty cents yields a more potent remedy, may be tolerated in private

practice when impressions are being registered through the pocket-book, but is little less than a crime when imposed upon the unconscious hospital exchequer. The use of alleged dressing-powders purchased at fabulous prices, or the application of precious-metal foil to cover sutured sterile wounds, when the wound would heal equally as promptly and just as effectually by the simple dressing of sterile gauze, is indeed an extravagance. The extravagance of useless surgical instruments and equipments is eloquently testified to in the storeroom of every hospital. Such items as unnecessarily increased laundry cost is exhibited in most operating room work, as well as the waste of suture material. Unduly liberal, and unnecessarily frequent dressings of wounds exhibit waste, if not meddlesome surgery. Ether becomes an item commanding consideration. The prescribing of a certain Chemical Company's product seems to have become a habit with most surgeons; a habit engrafted not unlike a fetich with some. At one time this product possibly deserved the preference given it. Whether it has maintained its merit or not need not be discussed here. Suffice to state other products possess equal merit and one other in particular has gained favor of preference by those who have studied the subject well. This latter ether is preferred by such institutions as the Union Protestant Infirmary of Baltimore and the New York Hospital. It obligates the hospital but little over half what the first mentioned brand costs, and requires less quantity for the same service. Yet a large proportion of the surgeons continue to prescribe the brand first referred to. These items cited are not all, in fact, they are but few, to illustrate the responsibility of the surgeon in his prescribing economic extravagance and waste of the hospital's resources.

In the community service of the hospital repetitions of the same care are frequently rendered the individual patient, or the subsequent treatment for a like disease or injury is given members of the individual's family. The necessity for the hospital giving this care, with its consequent expense, could have been avoided and this expense saved had intelligent action been exercised. These services are imposed upon the institution oftentimes on account of the ignorance of the afflicted, not knowing how to avoid the disease or the injury. The infected hand patient, who through ignorant procrastination suffers the loss of his hand and endures a morbidity which imposes his care upon the hospital for two or more weeks, should not, and will not, impose a repeated expense upon the hospital for like care when again he becomes a victim of another similar infection, provided he should have been taught the meaning of the simple infection

and its significance if early treatment be neglected. Such teaching having been received by him, he is most likely to become a valuable emissary to his family, and also to his acquaintances in enlightening them for their protection, thereby lessening the cost to the hospital for care that might otherwise have been necessary. To protect the hospital against repeated obligations of this type it is obviously desirable that instructions for the afflicted be provided. Two classes of practical instructions may be provided for the hospital patient: that given by the surgeon upon his visits; the other that which should be provided for the convalescent hours. A direct statement from the surgeon as to the cause of the trouble and the means by which recurrence of similar trouble may be avoided is capable of being driven home with force in this way and will effect valuable help not only to the individual but also upon those with whom he subsequently comes into contact. The convalescent hours when the patients congregate for gossip are alike dangerous to the patient and to the hospital. There is a seeming natural desire upon the part of the convalescent to talk operation, and too frequently this talk takes the form of extravagance, if not imagination. Among some it is the particular desire to highly color personal experience. The hour comes when there is a veritable contest in which one convalescent tries to outdo the other in reciting alleged unhappy hospital experiences. The surgeon, the nurse, and the hospital as well, are misrepresented and oftentimes to the discredit of the hospital and its agents. In these hours of idleness evil imagination is stimulated and fed. Seldom any good comes from these social conferences. Why not protect the patients and the hospital from them, and further, why not provide to utilize this time in giving instruction that will lessen subsequent sickness and accidents among these people. The opportunity for useful instruction is obvious. If the surgeon realizes this he may foster upon the hospital management the conviction of its desire and secure means for this special economic help.

In hospital construction the members of the medical staff have their part. Insistence upon extra building for the accommodation of some special department when after provisions are made the service of the department is not availed of, is a misappropriation of funds. In a recent survey of several hospitals, sixteen institutions had provided for a morgue with equipment for autopsies. These institutions had the usual quota of deaths, yet but four of these had an autopsy performed during the period of a year and only fourteen autopsies had been performed in all of the sixteen hospitals. In

one institution a hydrotherapy department had been provided in response to solicitation from the medical staff at a cost of approximately \$20,000. At the time of my visit, when a hundred and fifty patients were in the house, together with a very large dispensary service, there had been five hydrotherapy treatments during the previous month. The average cost of constructing and equipping the morgue was \$7000, and less than 25 per cent. of these equipments had been used. It is not to discredit the good service an equipped morgue may yield that I refer to this observation; instead, it is to emphasize the inconsistency of urging its needs and then not using it, and, too, to point out the wasteful dissipation of the monies. To influence expenditures of monies for purposes which do not yield a commensurate return in service is an economic waste. The surgeon who influences the building of a morgue or the constructing of a department for hydrotherapy or any other service which is not subsequently utilized assumes the burden for the economic waste.

In order that a more thorough study of a patient be made to determine definitely the true nature of the illness, a preliminary stay in the hospital is sometimes desirable. The procedure may prove an economy to the institution when the course is expedited, but when procrastination is practiced the course becomes an additional expense. The surgeon should have in mind that every day which a patient is cared for in a hospital there is a cost for the institution to pay. A patient with suspected renal stone to be kept in the hospital for ten days for skiagraphic study when equally as satisfactory study could be determined in two days is imposing an unjustifiable expenditure upon the institution. Under the convenient pretext of "studying the case" oftentimes a patient impatiently waits and the hospital is submitted to the cost for the care, when in truth the indifference or the convenience of the surgeon's pleasure is being served. To conserve the economy of cost for hospital care the morbidity period should be studied. While the haste to operate without clearly defined necessity is to be deplored, to delay operation carries its obligations. To postpone an appendectomy for to-morrow when its removal to-day favors a primary closure with two weeks' morbidity or delay with drainage imposing four weeks' morbidity, shoulders a responsibility upon the procrastinator. Whatever else such delay has occasioned, it has caused an increase of 100 per cent. cost to the hospital for the care of the patient. The surgeon needs to avoid procrastinating study, delayed treat-

ment and protect against extension of stay in the hospital to serve the best economic interest.

It has been my aim to point out some incidents that might illustrate the contention that the surgeon shares the responsibility for the hospital's lack of economic efficiency. It has been attempted in the hope that by so doing some correction might be made. The surgeon is directly responsible for loss of service and the embarrassment to the organization when late for operation, dressings, or other appointments; for the waste in using unnecessary or unduly expensive supplies; for unduly extending hospital care; and for misuse of funds occasioned by encouraging expenditures for construction and equipment which do not give commensurate beneficial returns. A staff surgeon must share responsibility for the neglect to utilize opportunities, which if taken advantage of would benefit the hospital. It is his duty to inspire enthusiasm in attendants; maintain congenial atmosphere for the patients; and to teach improvements in service. It is his opportunity to teach the patient better care for self; give him knowledge to prevent recurrence of disease or injury. His opportunities for service to conserve the institution's interest are many and his responsibility proportionate.

#### DISCUSSION ON THE PAPERS OF DRs. DICKINSON AND MARVEL.

DR. GEORGE VAN AMBER BROWN, Detroit.—Recently at our hospital the staff appointed me with two others to look into the economics of the hospital, and about the first thing we decided on was this: The most extravagant thing about the hospital is the surgeon himself. He begins by being late for operation, and by so doing, upsets the program of the whole day. Everything goes wrong, but he is perfectly satisfied if he is allowed to operate at that particular hour, but if he finds that his own time has been wasted he is very much upset.

Let us take the question of dry or wet gloves. If the operator is using wet ones, have several boiled for him. If in operating he meets with an accident and tears his gloves and waits to have them boiled again, it takes time and means money. The same thing is true with gowns. The Mayos sent out a pamphlet showing how economy could be practised in the use of gowns. Often an operator will use two or more gowns in one operation, especially if it is a two step operation, or if he is doing pelvic or abdominal work. It should be done with one gown, protecting his abdomen with a large towel. In the use of sponges, it is a common thing to see a man use two or three dozen abdominal sponges where he could have used three or four to a much better advantage. In fact, the structures of the patient would have received less injury, as Dr. Bainbridge pointed out yesterday. Every time you put a towel in the abdomen you

do harm. We do not like to use more than we have to. If we put in a dozen we have an increased laundry bill to pay, to say nothing of the harm done the patient.

Catgut is one of the expensive things we use. Time and again I have seen surgeons use 18 inches when they could have gotten along with an 8- or 10-inch piece. They use catgut where silk would be better.

As regards anesthetics, there is nothing that saves the hospital so much expense as the use of gas instead of ether. In considering the financial side, a great deal of the expense comes in the after-care of the patient, who has received ether as an anesthetic, the first two hours before he has awakened from its influence. The patient who has been under the influence of ether for a long time and is vomiting has to have a nurse sitting at the bedside waiting for her to wake up. This is all done away with if you use gas, because the patient in two or three minutes is awake, does not need so much after-care, and there are not the howling and disturbing factors which go with ether patients.

Another thing, the indigent patients in the hospital want to be entertained; they are lonesome; so many of them can neither read nor write, or they are not in the habit of entertaining themselves. If you can give these patients some work to do, have them make sponges, etc., and let them see they are doing it for other people who are sick, they become interested, and it is a great saving to the hospital.

The plea of economy should be the keynote in advocating hospital reform to the officials.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In discussing the papers of Dr. Dickinson and Dr. Marvel, I think all will agree with the many points emphasized by Dr. Marvel, much discussion having been given to them, but the key to the points emphasized by Dr. Dickinson has not received the attention that it deserves. In other words, the important question is not so much the responsibility of the surgeon to the hospital, but the responsibility of the managing board of the hospital to the surgical and medical staff. Team work implies work on both sides. A few extra pounds of cotton or gauze, a few additional ligatures, etc., may be important enough, but they sink into insignificance when compared with the conservation of the surgeon's time, strength, and nervous equilibrium.

DR. CHARLES P. EMERSON, Indianapolis, Indiana (by invitation).—It has been my privilege to have been connected with several hospitals, so I can appreciate the problems presented by the last speaker. To show that these hospital problems are not inevitable, I would like to outline the organization of our University hospital.

The University of Indiana has a hospital which is a gift to the State on behalf of the University by one of the doctors, Dr. Robert W. Long, who started as a poor boy, but who was able to amass a fortune. When first he considered founding a hospital he studied several plans. One was to give the hospital to one of several



churches, or to found an independent institution, but he decided, following the advice of his medical friends, that the safest place for a hospital was a University; an independent hospital with an endowment may soon run out of funds because of the changes in value of investments, changes of prices of commodities, and, especially, increased demands resulting from advancing science. If, however, the hospital is a part of a university, the appropriations will increase automatically. Also a university is a safe place for medical reasons, since it cannot easily come under the dominion of one man. And so his gift was a hospital, an integral part of Indiana University. Dr. Long lived nearly seventy years in Indianapolis and so knew most of the medical men of the city, but he did not use his influence in the slightest to hamper the financial, material, or professional work of the institution. When asked to express his opinion concerning appointments, he would reply, "That is up to you and your committees." He visited the wards almost daily to see the patients. He was happy with his gift and enjoyed it for almost two years.

How is the hospital managed? First of all, the hospital is a part of Indiana University; it is a part of the medical school just as the anatomical laboratory is a part of the medical school. It is governed by the medical school committees, the same committees that give a budget to the medical school in behalf of the board of trustees. The same committee that apportions the work in the lecture rooms, and laboratory rooms, also apportions the work in the ward rooms, and any man on the teaching staff is subject to hospital work. It is the laboratory of the medical and surgical departments. The committee is especially careful with reference to the finances of the hospital, and to the same committee is entrusted the finances of the medical school under the board of trustees. The committee which controls the medical work is an educational committee, composed of physicians and surgeons, and they know whether there is any waste or not.

Dr. Long showed great wisdom when he said the hospital must be a part of a larger institution. There is safety if a hospital is part of a whole university with its different departments. It will live on and keep growing with the rest of the university and not suffer many of the evils which a single hospital under a separate board of trustees might suffer.

We have a superintendent of nurses. She is the head of the training school. Our training school for nurses is a part of Indiana University. A young girl, to enter, must matriculate in the University and is required to do university work under university teachers.

The last point is this: if between the dates of the meetings of the educational committee trouble should arise, it is referred to the secretary of the school, a trained accountant, and he will decide pending the next meeting of the educational committee which passes on all questions connected with the medical and surgical departments of Indiana University.

DR. JAMES E. SADLER, Poughkeepsie, N. Y.—I should like very

much to discuss Dr. Marvel's paper, and at some length, but the fact of the matter is that every word Dr. Marvel has stated is so absolutely true, and to the point, that it permits of no discussion or argument. The waste that is going on in hospitals throughout the country is, to my mind, enormous, and I think this is brought home to some of our men, including Dr. Marvel and myself, more particularly than to some others, because while we have our general hospitals and are always considering their finances and aim to improve their conditions economically, we also—having private institutions of our own—know what it is actually to pay the bills. When a person is compelled to go down into his own pocket for the maintenance of an institution, he is careful to see that no great extravagances are indulged in. Many times have I noticed, as has been outlined by Dr. Marvel and Dr. Brown, where five dollars worth of catgut has been used upon a case when the actual amount necessary would not have cost more than a dollar.

With reference to Dr. Dickinson's paper, I was delighted to hear it. It recalled vividly to my mind an occasion, nearly twenty years ago, when in connection with an institution in a small town I suggested to the board of trustees that they select three or four men from the medical staff to consult with them and guide them right with reference to the medical end of the hospital. My idea never held—it never came about—and that institution which could have been of great value, had it been properly cared for, is largely superseded to-day by an institution that is so poor that it is practically living from "hand to mouth," whereas the other institution has enormous amounts of money at its disposal.

Dr. Dickinson has an excellent idea in this suggestion of putting a certain number of medical men on the board of trustees. That might not apply as well to the larger hospitals associated with the medical departments of universities, but for the mass of hospitals it would certainly be a splendid plan.

DR. R. R. HUGGINS, Pittsburgh.—Just a word or two in regard to Dr. Dickinson's paper. In so many of our hospitals there is a lack of coöperation of the staff itself. This is a very vital point. If there is one good man, who has ability, who is honest, and can direct the affairs of the staff intelligently and efficiently, well and good. On the other hand, if you have a man who is constantly exploiting himself, it does not matter how good he may be, it brings up the whole principle of what our duty is to our fellows. Many an efficient hospital is ruined because there are one or two men who are promoters and the rest of the fellows go along either because they are weak or do not care to interest themselves in the welfare of the institution. There is a time coming when the members of the medical staff will display a little backbone. When that time comes, the board will recognize the strength of the staff and there will be little difficulty.

DR. FRANCIS REDER, St. Louis, Missouri.—These two papers contain points of great importance. I would like to speak briefly with reference to municipal hospitals. The city hospital in St.

Louis is an institution that has over a thousand beds. The question of economy and of efficiency is always facing this institution. Six years ago the system was entirely changed. Instead of having a superintendent who also acted as surgeon and physician in charge, a staff was appointed covering all branches of medicine. This staff consisted of about sixty physicians, specialists in their particular fields. It was a great improvement over the old system. Two years ago the unit system was put into operation. One unit was given over to the Washington University; another unit was given to the St. Louis University, and a third unit, known as the open unit, was given over to the municipality. So far it appears that the unit system is an improvement over the régime when no units were in vogue.

The present superintendent of the hospital has for five years been an interne in the same institution. He is familiar with its workings and well understands the staff system. There is a resident surgeon and physician. The duties of these officers do not conflict with those of the visiting staff. There is a senior for each division. Each visiting surgeon has one senior and two internes at his disposal. The visiting surgeon has two operating days out of the week. The service is for a period of two years.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—There is one phase of this subject that has not been brought out, and that I would like to discuss. There is one way to remove some of the faults to which Dr. Dickinson has called our attention. In Cincinnati, we have a municipal hospital which is under the control of a political appointee. Some years ago we had a board of medical directors on which my distinguished colleague Dr. Zinke served, and I afterward served on the same board. This board consisted of three men as go betweens between the politicians and the doctors. They had a nominal salary of five hundred dollars each per annum, and they saved the hospital many thousand dollars a year because they were doctors themselves and were not in competition with the men on the staff, and their suggestions as to economies went. Now things have turned around on account of politics; they got rid of that board, and they are paying the penalty for it.

In a private hospital it is not possible to get men that would serve that way, but it seems to me the remedy there is for the staff itself to elect these representatives to serve with the board of directors.

Just one word on the economy proposition and I will not detain you any longer. I happen to have a few dollars invested in a hotel in Cincinnati. I can walk into that hotel to-morrow morning and tell how many guests they have had in the last twenty-four hours; I can go to the treasurer of that hotel and he will tell me how many meals have been served, what the average cost of each meal has been, and what the profit of each meal was within the last twenty-four hours. If the man in charge does not make so many dollars bring in so much return to the dining-room he is called on the carpet. The same business principles should be applied to hospital arrangements. For instance, if you find Dr. Brown on his service is taking care of ten patients at a cost of twice as much as Dr. Bainbridge,

you are going to know the reason why. It is simply a matter of book-keeping and publicity.

The next thing that Dr. Dickinson brought up was this: the doctor must have the respect of the board, and we do not have it as much as we ought. There are two reasons for this. In the first place, a long time ago we commenced working for nothing and no one appreciates what he gets for nothing. In the second place, we did not demand respect. A man never gets any more respect than he demands.

One doctor spoke about forming clubs and getting acquainted with one another. It is a good thing to become acquainted with business men and show them that you have got as much sense as they have, and then they will not only respect you as a doctor but as a citizen.

DR. DICKINSON (closing).—I have no axe to grind. I have nothing personal in this matter, but I have great interest in the young doctor—not you men, but the young doctor out in a community who is tied up to a hospital which runs along for fifteen or twenty years and then closes. What is he going to do? You have avoided telling what can be done. Unless we start some inspection among our societies, look into the different communities and standardize hospital management, find out our professional relations to the institution, send on to the different hospitals for information as to how many shall go on the staff, how many shall compose the board of managers, and what their relation shall be, and how important it is to have a superintendent who is agreeable to all, we will not have anything done.

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### GOITER AND PREGNANCY.\*

BY

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#### SIMPLE GOITER AND PREGNANCY.

DURING pregnancy the thyroid gland nearly always undergoes an increase in volume which remains more or less marked all through the puerperal period. According to Seitz, this increase in volume occurs in 65 to 90 per cent. of all cases of pregnancy. Out of 718 pregnant women seen by Rübsammen, 89.5 per cent. of the cases showed glandular enlargement. According to Lange, thyroid hyperplasia in pregnancy has been found in 108 out of 133 cases; when goiter existed previously, it always increased in volume during pregnancy. Von Graef examined 654 pregnant women during the second half of their pregnancy, 48.7 per cent. of them showed a

\* Read by title at the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

thyroid enlargement. The same author examining 256 pregnant Viennese women found that 44 per cent. of them had goiter. Of course, many of these women had had goiter prior to their pregnancy. This does not disprove anything, as he then found 38.5 per cent. of these goiterous women showed a marked increase in the volume of their goiter during pregnancy and delivery. According to Freund and Lange, hyperplasia takes place sooner in multiparæ than in primiparæ; it appears in the fifth month in the former, and in the sixth month in the latter. It begins to retrocede a few hours after delivery, and keeps on decreasing in size for weeks after. The thyroid, however, never returns to its normal size. Lactation seems to be devoid of any influence over the volume of the thyroid.

The increase in volume is due to hypertrophy and hyperplasia of the parenchymatous elements; colloid and cystic nodules, when present, are only slightly involved. According to Seitz, the increase in volume is due to the action of the placental products over the thyroid. This glandular hyperplasia seems to be intended to destroy the product of autointoxication and changes in the serum caused by pregnancy, and it seems that women who do not show any hyperplasia of the thyroid are very apt to have albuminuria and eclampsia afterward. The latter part of the proposition is not simply a coincidence, as Lange has shown. Indeed, if in nonpregnant cats one-fifth of the thyroid is removed, no ill effects whatever are observed, but if the cats are pregnant, the same operation causes at once albuminuria and nephritis. Thyroid opotherapy undertaken in such animals causes the symptoms to retrocede at once. Nicholson obtained the same results. The treatment with thyroid extract of four pregnant women with albuminuria and eclampsia gave very good results. Seitz, Döderlein and others believe, however, that eclampsia is of parathyroid origin. Whatever the theory may be, we must admit that thyroid hyperplasia in pregnancy is a physiological process, most likely intended to deliver the organism of waste products taking their origin in the mother and child. Perhaps, too, this hyperplasia is intended to counterbalance the temporarily lost function of the ovary.

In the majority of cases during labor, and especially during delivery, the goiter increases materially in size. Sometimes, it acquires such dimensions that bursting of the neck seems to be imminent. Dyspnea and cyanosis are very marked. It is seldom, however, that the dyspneic symptoms become such as to necessitate surgical intervention. During labor and delivery pains, on account of pressure from the goiter, the pulse in the carotids disappears; this can be

controlled easily by taking the pulse over the temporal artery. Guyon considers this phenomenon as an attempt of nature to regulate the cerebral circulation. In goiters of long standing the goiter-heart is always present, and must be regarded as a bad complication. In other conditions, tachycardia may become a very troublesome and alarming symptom.

*Treatment.*—In all pregnant women, the condition of the thyroid should receive careful attention. If this gland is found manifestly enlarged or altered, and if evidence of thyroid insufficiency is found, the active principle of the gland in some available form should be administered. In that, everybody agrees. Small doses may be given and should be continued for several weeks or months.

As it has even been found that thyroid opotherapy started in the early period of pregnancy prevented thyroid hyperplasia, and as, furthermore, it has been shown experimentally that it prevents albuminuria and nephritis in pregnant thyroidectomized cats, it might be worth while to undertake a series of experiments in order to find out if it would not be advisable to feed pregnant women with thyroid extract, thus hoping to prevent some of the dreaded complications of pregnancy as albuminuria, eclampsia, etc.

In every case of pregnancy complicated with goiter, may it be simple or thyrotoxic, or both together, the wishes of the parents regarding the life of the child should always be carefully ascertained and the situation explained to them. Where children have been lost previously, and the parents are desirous of offspring, all possible means should be used to continue the pregnancy without, of course, undue risk to the mother. As soon, however, as the pregnancy is terminated, the physician or obstetrician should consider it one of his first duties to have the patient seek surgical advice and treatment in order to permanently remedy the thyroid condition.

When pregnancy is complicated with simple goiter only, no one should be unduly alarmed, the course of the pregnancy should be allowed to go on, and in the greatest majority of cases everything will terminate to the entire satisfaction of the patient as well as to the attending physician, even if during labor dyspnea and cyanosis seem at first to threaten to become alarming. If, however, on account of the goiter the patient has previously lost a child, and if the symptoms have been such as to endanger the life of the mother, elective Cesarean section should be selected.

In cases where before labor the dyspneic symptoms are marked, congestion of the cervical region with "caput medusæ" highly developed, it is logical to assume that the dyspnea will be greatly

increased during labor. In such conditions, elective Cesarean section can be made before the labor pains have started. If labor and dilatation are already far advanced, pituitrin, judiciously administered, may greatly accelerate labor and shorten its duration. If dilatation is more or less complete, forceps may be necessary. If dilatation is not far enough advanced, but engagement is well started, a vaginal Cesarean section may save both mother and child. As in these cases the sole object of surgical intervention is "to do everything quickly," the induction of labor with elastic bags is, of course, to be rejected as it is a too slow and uncertain process, adds to the mother's nervousness and exposes to rupture of the uterus in delivering a child through a partially dilated cervix.

Thyroidectomy in such conditions should be very seldom undertaken as the operation is rendered extremely difficult by the enormous active and passive venous congestion of the entire cervical region; furthermore, the thyroid during pregnancy is in a state of compensatory hypertrophy, consequently it is difficult to judge how much gland should be removed and how much should be left. Thyroidectomy will be a much safer process after the obstetrical ordeal is over. Tracheotomy must be considered only as a life-saving device.

In all these cases the administration of an anesthetic is a very serious matter, and should be given the greatest care and attention, for it may prove disastrous. When necessary, surgical intervention is better made under local anesthesia.

#### EXOPHTHALMIC GOITER IN PREGNANCY.

That a woman afflicted with Graves' disease may become pregnant, or that thyrotoxicosis may develop either during, or at least, in connection with pregnancy, is a well-known fact. The point of interest does not lie therein. What we want to know is, how do these conditions influence each other, and what shall be our attitude on these given cases?

The coincidence of pregnancy with Basedow is not so frequent. Out of 15,000 women seen in the Maternity of Edinburgh by Halliday-Croom, only one case of exophthalmic goiter in pregnancy was seen. The other twelve cases which he reported were taken from his private practice, hence his conclusion is that pregnancy and Graves' disease are oftener found among the rich classes than among the poor ones. Bonnaire came to the same conclusion as out of 30,000 pregnant women he saw there were only two cases of exophthalmic goiter.

Seitz has collected 112 cases of exophthalmic goiter complicated with pregnancy from his own material, from literature, and from circular letters. He has carefully tabulated the menstrual history, the appearance of the first symptoms, the history of the previous pregnancies, the therapy employed, and the results as far as mother and child were concerned. He found that hyperthyroidism was not affected one way or the other in 40 per cent. of the cases. A very small number even improved during pregnancy. On the other hand, 67 out of 112 cases, namely, 60 per cent. of the total, were made distinctly worse by gestation. In one-fourth of these 67 patients a serious menace as to health and life was the consequence of thyrotoxicosis; 7 patients died; in 5 cases therapeutical abortion and 11 premature labors occurred; 3 miscarriages, and 3 macerated fetuses were observed. In 7 cases thyroidectomy was performed during pregnancy.

Bernard Von Beck in 260 cases of Graves' disease and pregnancy said that he felt compelled to perform thyroidectomy in 5 cases, and in no case did he find it necessary to interrupt the pregnancy. As Gellhorn says, this is indeed a remarkable record and may be explained by the fact that these thyrotoxic conditions were secondary to previously existing goiters as in the region where Von Beck is working, goiter is endemic. Theilhaber found that the majority of coincident cases of pregnancy and Graves' disease were made distinctly worse by the disease and only the minority were improved by it. Kleinwachter and Hirst came to the same conclusion that Graves' disease is unfavorably influenced by pregnancy, and that it often has its origin in gestation. It predisposes the patients to uterine hemorrhages and may result in the death of the fetus. Such cases are often complicated with albuminuria. Whitridge Williams considers that pregnancy exerts a deleterious influence on Graves' disease; he found that tachycardia was greatly increased during gestation and lessened soon after labor.

We can consequently conclude that the majority of patients with Graves' disease are made worse by pregnancy. Pregnancy must be regarded as a serious complication in thyrotoxicosis. This is so true that Theilhaber has said, speaking of thyrotoxic patients:

"Girls, no marriage; women, no pregnancy; mothers, no nursing."

*Treatment.*—So far as Graves' disease is concerned, medical treatment should be given the greatest care and attention as soon as pregnancy is detected. Every form of treatment can be given a trial. Opothrapy with hypophysis or thymus may be attempted; opothrapy with thyroid should be handled with extreme care.



Every one of these treatments will sometimes give good results, more often, none, or will make the condition of the patient worse. Up to date, the best treatment yet known is a dietetic, hygienic régime. The majority of cases so treated will be kept in fairly good condition and may be brought to the full term of their pregnancy without serious nervous disturbances. At any rate, during the early period of pregnancy, the treatment must be an expectant one. If later, however, the condition of the patient grows worse, surgical intervention then becomes necessary.

Surgically, two questions arise: Shall we perform a thyroidectomy, or shall we resort to an obstetrical operation? So far, the trend of opinion seems to be in favor of the second alternative. If the fetus is viable, a premature Cesarean section may save its life, which very likely would be lost if allowed to go to full term. If, on the other hand, the fetus is not viable and the condition of the mother is such as to necessitate surgical intervention, the life of the child should be sacrificed without hesitation, as, at any rate, it is bound to be lost anyway. In such cases, the mother's life only should be taken into consideration.

I believe, however, that we should not wait until these thyrotoxic symptoms complicated with pregnancy have become so serious as to endanger the life of both mother and child. A timely thyroidectomy, as I have performed it twice, seems to be the ideal procedure as it not only wonderfully benefits the thyrotoxic condition, but also allows the pregnancy to go to full term, and saves the life of the child without undue risks for the mother.

Basedow patients should be guarded against marriage, and especially against pregnancy. At any rate, before entering married life they should have thyroidectomy performed in order to safeguard them against any future exacerbations and to protect their future offspring. It is true that in severe forms of Graves' disease, the chances for pregnancy are considerably reduced, because the sexual apparatus is in a state of hypofunction. This, however, is not always the case and pregnancies may occur even in very severe cases of thyrotoxicosis. When this is the case, "sterilization" of the women should be performed.

## POSTPUERPERAL STERILITY—ITS CAUSE AND SURGICAL TREATMENT.\*

BY

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GYNECOLOGY means, not ablation or distortion of organs, but conservation of the procreative functions of womanhood.

The clinical picture of the "group" of cases indicated by the title of this paper is familiar to you all. That it is distinctive and real is true, and also that it offers possibilities for surgical relief I believe can be established. It is most often a sequel to the confinement of primiparæ, but may occur later in the child-bearing period. As a sequence to mild postpartum infection, it resembles in pathology and in results, sequelæ to the exanthemata in early girlhood; the difference being that on the one hand we have a hope of clearance from the marital relations, and on the other this hope has been dispelled.

The patient comes with a chief complaint of "pain;" and pain, mark you, is the distress signal of pathologic foci. We get the history of a "labor" several years ago with no distinctive feature save a "chill" within the limits of the first week of the puerperium. This chill, followed by fever for several hours causes no alarm, and the convalescence, in other respects, seems perfectly normal. The mother after the usual "rest in bed"—which is never long enough—will resume her care of the household, and as a rule, will nurse her babe throughout the allotted time. The menses reappear, but the rhythm is broken, the interval being either too short or too long, with some discomfort amounting to pain during the flow, which is either too scant, or too free; while a moderate leukorrhea just after the menstrual epoch is the rule. In a general way the health is fairly good, and yet not up to normal. The appetite is fitful and the food is not digested well, thus bringing the usual sequence of constipation and loss of weight. The years go by, with no conceptions: while blended with the pain and the clinical picture here portrayed, and in a subconscious way perhaps, is a wonder at such break in the cycle of normal marital relations.

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Now let us consider the pain, with its *three distinctive points*, and their meaning; and that we may get a clear conception of conditions we will picture just what happened at the time of confinement. The "chill" was the culmination of a mild infection, for nothing else would cause an explosion of this type; the invasion through just a break, perhaps in the mucous membrane of the outlet, or as likely at the site of placental attachment, traversed the Fallopian tubes and started a conflagration of intrapelvic cellular structures which spent itself and stopped just short of pus possibilities, *but not before singeing their delicate fimbriæ and sealing them to the surface of each ovary*. Thus function is abolished, for the fimbriæ, save when in spasmodic clasp of the ovary, should "float free like a fish's fins in water," and two pain points established by distorted anatomic conditions.

Being a neighboring structure, cushioned in similar cellular tissues, and vitalized by communicating circulatory fluids, the appendix is caught in the conflagration just as the branches of a neighboring tree when a house is burned. Like the fimbriæ of the tubes this "little assassin" with its meso-attachment, is devitalized just to the point of permanent injury, leaving, perhaps, fixation at its base to the head of the cecum with lessening of its lumen quite sufficient to hold any harbored enterolith, or abolish any possible function with which it may be accredited; and giving us the third pain point of so much value in the classic group of physical signs distinctive of this pathology.

Therefore—our physical examination gives us tenderness per vaginam—to the right and to the left of the uterus—while this organ swings free and in a normal position. From above, deep pressure just above the left ovary gives pain though it is not always marked, while on the right we find the usual blend confirming the feel from below of a tender ovary, and also the *reflex epigastric discomfort ever coincident with involvement of the appendix*.

In addition to the three pain points the importance of which I wish to emphasize, the patient will give a history of pelvic discomfort when walking, most marked when coming down a stairway, or stepping off the curbing, and her graphic account of a "pulling sensation" when lying down especially when lying on the left side, the fixation seeming to be in the right lower quadrant, and of such severity as to have prevented her lying on the side for years, and also to prevent sleep; is not only a constant feature in the clinical history just portrayed, but confirmatory of the existing pathology.

Years ago, Lawson Tait and Joseph Price developed the late

pathology of tubes and ovaries, and established the justice of their removal. To-day our chief advances lie in early recognition, and in preventive measures. This condition, the result of infection, will not clear up, time only emphasizing the agglutination of structures and perpetuating the abolition of function. Therefore it only remains to suggest a method promising to relieve symptoms and restore function—this promise comes, I believe, through surgery; and is made possible only by the perfect toilet and precise technique of to-day.

After the usual preparation for an abdominal section the approach may be made through either a free right rectus, or a median incision; preferably median, unless the patient be a thin subject with a shallow pelvis. The appendix is sought and removed, with the freeing of any bands that may favor normal rotation of the cecum. At this juncture the head should be lowered, as free exposure facilitates both investigation and handling of the appendages. Then with the uterine fundus as a starting-point, and tracking down to the right, and to the left, of the pelvis, each Fallopian tube is palpated to its limit; and each, in turn, with its adjacent ovary brought into view. The fimbriæ, if welded to the surface of the ovary, is gently freed, entire, and with very gentle manipulation normal conditions restored to this delicate fringed extremity. If pain *during menstruation* has been marked, suggesting obstruction to normal currents through the Fallopian tube—each fringed extremity may be carefully surrounded by gauze, the ostium abdominal exposed, and a filiform bougie passed through the lumen of the tube to the limit of the uterine cavity, thus freeing any possible occlusion and establishing its patency. Finally, after careful restoration of the appendages to their “home” in the pelvis, the patient is lowered, and a half pint of normal saline solution introduced into the cavity just before closure of the abdominal incision. This last step is important, the solution assuring that the fimbriæ float free for just a little while, until the edges are slightly seared and do not become again agglutinated to the surface of the ovary.

Results, in the few cases in which this procedure has been used (and I have not had occasion to “sound” the Fallopian tubes), have been gratifying. The pain points have disappeared, and the patients walk and lie on either side with comfort. The appetite has returned, and digestion is good, with the resultant gain in weight. While of prime importance is the fact *that menstruation has resumed its normal cycle without discomfort.*

308 MASONIC TEMPLE.

STRANGULATED OVARIAN CYST SIMULATING  
APPENDICITIS.\*

BY

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At the Buffalo Meeting of this Society, one of our members, Dr. K. I. Sands, presented a paper on "Torsion of Ovarian Cyst," and so completely did he cover the subject, that it would be superfluous for me to repeat anything which he described in his excellent paper at that time.

To-day I wish to take up one phase of abdominal surgery in which torsion of the ovarian cyst figures largely; namely, strangulation of an ovarian cyst simulating appendicitis. That there is a great similarity between these conditions is well known to us surgeons, and reference to our records will prove this assertion. In the earlier days of abdominal surgery, these conditions were more frequently confounded than at the present time. A series of four cases occurring in my own practice, which I diagnosed as acute appendicitis and operated therefor, prompted me to investigate this condition. But, much to my surprise, a search of the literature revealed that very little had been written thereon.

I should like, first, to report briefly the history of these four cases.

**CASE I.**—Mrs. B., aged forty-six, married, mother of three children. Past history, negative. Two or three days before admittance to the hospital was seized with an excruciating pain in the right side, so much so that she went into a state of collapse and with difficulty was revived. Upon admittance to the hospital, the entire abdomen was rigid and board-like, and it was impossible to make a thoroughly satisfactory physical examination. However, she was more sensitive in the lower right quadrant and in the region of the appendix than elsewhere, and because of this and her menstrual history, which was negative, an incision over the site of the appendix was made. The appendix was found to be somewhat inflamed, but not sufficiently so to give rise to the grave symptoms which she presented. Further search revealed a large necrotic mass occupying the lower part of the pelvis and extending somewhat over toward the median line. A median incision was then made below the umbilicus and there was disclosed a strangulated ovarian cyst, the size of a coconut. Cyst

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was somewhat adherent to the intestine, but was finally removed, and the patient made an uneventful, though stormy, recovery.

CASE II.—Miss N. H., aged thirty-five, housewife. First seen by me on August 13, 1909, at that time complaining of pain in the abdomen. Family history, negative. Past history, negative, except that she had typhoid fever at eleven years. Has always had considerable pain in the region of the right ovary during menstruation. Last menstruation ended August 13, 1909. On August 13th felt nauseated. The next morning, following movement of bowels, had severe pain throughout abdomen, and compelled to go to bed. Pain increased until Aug. 15th, when it became easier. Abdomen greatly distended. Gradually improved. When she entered the hospital on August 20th, distension was very marked, little pain but evidently had a general peritonitis. She had been flowing the previous day (the 19th) and this continued.

When seen by me this patient had already been ill two days, and her abdomen being very tense all over, especially in the right side, where it also was more tender, caused me to make the diagnosis of a ruptured appendix. As she had a weak heart and was in no condition for an operation, I advised putting her upon a modified Ochsner treatment, and awaiting developments. She gradually improved and was brought to the hospital a week after the commencement of her attack.

She was prepared in the usual way for an appendectomy. Upon opening the abdomen, however, a dark necrotic mass about the size of a child's head presented itself, and upon investigation this was found to be a gangrenous ovarian cyst, caused by the pedicle becoming twisted upon itself. The appendix was somewhat inflamed, but only secondarily, and was not responsible in any way for the symptoms found at my first examination. Patient was treated in the usual manner and made a slow, but fair, recovery.

CASE III.—Miss A. C., aged nine, school girl, admitted to the Child's Ward of the Albany Hospital, September 10, 1910. Family history, negative. Past history, negative. Present illness, one year ago had an attack of "stomach trouble," with pain in abdomen, and vomiting. Three days before entering hospital, patient had a severe attack of abdominal pain, with vomiting. Examination of her abdomen at the hospital revealed marked distention and rigidity, with marked tenderness under McBurney's point. Patient constipated and tongue coated with grayish film. Pulse upon entering hospital 94 and temperature 99. Owing to her previous history, together with marked distention and rigidity, and the pain over McBurney's point, diagnosis of a gangrenous appendix was made and operation advised.

The usual appendicular incision was made, but upon entering the abdomen, an ovarian cyst the size of a grapefruit was encountered, which was gangrenous. This gangrenous condition was caused by the twisting of the pedicle of the cyst. The appendix was secondarily involved, but had not reached the stage which would cause the symptoms which she exhibited.

CASE IV.—Mrs. L., aged twenty-six, married about a year. Past history, negative. Menstrual history, absolutely normal. Two weeks previous to attack was delivered of a fine baby boy. Convalescence uneventful for a period of seven days, then temperature began gradually to rise (102.2), pulse to increase (110) and pain suddenly appeared in the lower right quadrant of the abdomen. The lochia, in the meanwhile, which from the beginning had been normal, showed no increase, no foul odor, and the uterus was not soft and boggy.

Bimanual examination was practically negative, though she was much more tender on the right side than on the left. Rectal examination was negative. Physical examination was negative, except in the lower right quadrant of the abdomen, which gave the characteristic board-like sensation of an acute appendicitis, but for the fact that it was rather low down for an appendix and a little too far toward the median line.

At operation, usual incision for the removal of appendix was made. Appendix was found to be in practically a normal condition. A little further search revealed an ovarian cyst the size of a hen's egg, well back toward the culdesac of Douglas, with a fairly long pedicle, which had become twisted and strangulated. Cyst removed and patient made an uneventful recovery.

In studying the histories of these cases, we glean some very interesting facts. They all complained of gastric disturbances; that is, all four had attacks of what seemed to be, and undoubtedly was, appendicitis. In two of these cases there was more or less disturbances of menstruation, though not of enough importance to particularly attract attention to it. In all four cases there was no suspicion of a tumor present before the operation.

Cases I and II are similar in character, because they occurred in women about the age when the menopause might be expected to be approaching. Upon entrance to the hospital both presented symptoms of general peritonitis, their abdomens being so rigid that it was impossible to make a thoroughly satisfactory physical examination in either case. Each was more rigid and tender in the right iliac region directly above the appendix, and vaginal and rectal examination were negative. They also displayed other symptoms of acute appendicitis—nausea, vomiting, and constipation.

Case III was not so severe, and all the symptoms were confined to the right iliac region, the rest of the abdomen being practically normal. Of course, we could obtain no menstrual history of this case and could make no vaginal examination, which might have aided us in our diagnosis. Rectal examination was thought unnecessary at the time.

Case IV, the attack occurred shortly after childbirth. This

case did not have all the earmarks of a regular appendicitis, but that diagnosis was made in lieu of any more definite symptoms appearing. The rigidity in this case was also confined to the right iliac region.

All of us are, of course, familiar with acute appendicitis and gangrenous ovarian cyst. Therefore we may pass over the matter of diagnosis of these two conditions, and discuss the more difficult step of differential diagnosis. In our differential diagnosis we have to depend more upon the clinical history than upon the physical examination, for the following reasons:

The board-like rigidity prevents our gaining anything from palpation or percussion. (These cases do not come to us until after peritoneal irritation has set in.)

Board-like rigidity is very common in all other abdominal conditions.

Almost all of the acute conditions occur on the right side.

Vaginal examination, while it may reveal a mass in the culdesac of Douglas, does not enable us to say that it is a cyst. This is also true of rectal examination.

On the other hand, clinical history shows that this attack occurs at the time of puberty or menopause or subsequent to unusual or violent exercise, such as that of labor in childbirth, etc. If we have such a clinical history, together with but very slightly elevated pulse and temperature, we should be on the alert for twisted ovarian cyst.

If opportunity were given to examine these cases immediately after the onset of the attack, and before peritoneal irritation had set in, it would no doubt have been possible to detect a tumor mass and a correct diagnosis made.

Following out this thought, the possibility of a floating kidney with a kinked ureter, simulating ovarian cyst, is likely, but here a careful examination of the urine will establish the diagnosis. Also in the kidney condition, the pain, etc., are found higher up and somewhat toward the back.

Thus, when the case comes to us for diagnosis, we are handicapped by the lack of assistance which palpation and percussion afford ordinarily. Deprived of these two important aids in diagnosis, we are compelled to rely almost entirely upon the clinical history.

In conclusion, then, let me say that strangulated ovarian cyst is rather common, simulating acute appendicitis in the majority of cases; that when we encounter the case of a patient approaching the menopause, or puberty, or one who shortly before has been delivered



of a child, we should consider, not only acute appendicitis, but twisted ovarian cyst as well.

Based upon my experience, I am of the opinion that it is absolutely impossible to make a differential diagnosis between these two cases, unless the case is seen early enough for one to make a thorough physical examination—at least, that was my experience in these four cases. Each had been sick for from three to four days before entering my service at the hospital, and consequently the physical findings were practically nil. But a complete and reliable clinical history of these cases would have been of great assistance to me.

The prognosis and treatment are combined in the one sentence: The earlier the diagnosis, the earlier the operation, the better the prognosis. Differential diagnosis is made difficult—often impossible—by the failure of the general practitioner to call the surgeon soon enough.

This also is to be considered in regard to the severe pain and collapse which present: When it occurs in a perforation of the appendix very few patients react, but die within 24 or 48 hours, while a similar pain in the same location, apparently equally as severe, producing a like collapse, in twisted ovarian pedicle a great majority will recover from the shock, living on for quite a long time, as the history of these cases indicates. This gangrenous condition of the cyst is not infective and the system tolerates this pathological condition for quite a long period. Therefore, when patients improve after such acute symptoms, my faith in my original diagnosis—perforative appendicitis—is modified when they go on to improvement, although having the symptoms of general peritonitis present.

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## DIGITAL ROTATION IN OCCIPITOPOSTERIOR POSITIONS OF THE VERTEX.\*

BY

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(With seven illustrations.)

*Introduction.*—The art of obstetrics may be said to date back to the beginning of the human race, yet it did not develop as a science of record until about the 14th century; but since then so much has been written and published on this subject, that it would

\* Read by title at the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

seem that but little remains to be said, particularly with regard to the mechanism and conduct of labor. However, after an extensive and careful review of the literature bearing upon the methods of applying digital or manual rotation of the vertex in occipitoposterior positions, one finds that the description of the technic employed is meager in the extreme; also that the sutures of the fetal head may be employed is mentioned only to point out the futility of attempting to make use of them for the purpose of performing rotation.

It is estimated that of all vertex presentations, 17 per cent. are occipitoposterior positions; although it is likely that many cases pass unrecognized, because of the fact that spontaneous rotation will ultimately occur in all but about 4 per cent. of them.

If we follow the teachings of the modern school of midwifery, we limit the duration of the second stage of labor, in order to avoid injury to the fetus from prolonged pressure upon its head. For the same reason the maternal parts should be protected from serious injury. Therefore, it is not always expedient to await the spontaneous anterior rotation of the occiput even when we have the knowledge that it will eventually occur.

The *probable* diagnosis of an occipitoposterior position of the vertex is oftentimes made by the failure of the labor to progress after the second stage of labor has been reached; its existence may be substantiated by abdominal palpation. Noting the absence of the rounded mass formed by the back of the fetus to either side of the median line anteriorly, the feebleness or total absence of the fetal heart sounds in these regions, or with their presence well out either side of the abdomen, all of which will serve to confirm the presumptive diagnosis; but the *positive* diagnosis of this position, as of any other, can be made only by the recognition of the landmarks on the fetal head. Here it might be well to define these landmarks, since their identification is so essential for a positive diagnosis.

*Landmarks.*—The most important landmarks of the fetal skull are the sutures formed by the junction of the occipital, the two parietal and the frontal bones (see Fig. 1). They are respectively the lambdoidal, which is the suture between the occipital and parietal bones; the sagittal, which unites the parietal bones; the coronal, which is formed by the junction of the two halves of the frontal bone; and the frontal, which is the cleft between the two halves of the frontal bone. The posterior fontanelle is at the junction of the lambdoid and sagittal sutures, and the anterior fontanelle is at the junction of the sagittal, the coronal and the frontal sutures. The ears, the

root of the nose and the orbital arches also form additional and useful landmarks.

**Diagnosis.**—The positive diagnosis of the position of the head in vertex presentations is thus made by digital palpation of the landmarks on the fetal head, the most accessible of which are the sutures and the fontanelles; their locality and the relation of the head to the pelvis of the mother, will determine the *position* of the vertex. The landmarks of the mother's pelvis need not be considered in this connection. The location of the landmarks on the fetal head is the essential point and determines the position of the vertex and its relation to the pelvis.

During the first stage of labor, when the os is imperfectly dilated and when the vertex is smooth and slippery, a *positive* diagnosis by digital palpation of the sutures and fontanelles is exceedingly diffi-

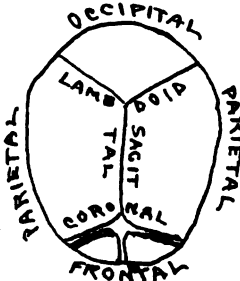


FIG. 1.

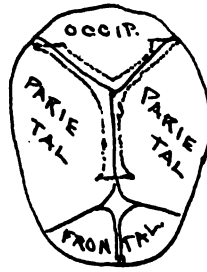


FIG. 2.

cult, if not impossible; while by abdominal palpation and auscultation, a *probable* diagnosis may be readily made. In the second stage of labor, when the cervix is fully dilated or dilatable, and the head is engaged, a *positive* diagnosis of an occipitoposterior position usually can be made. The head once fixed in the brim, the sutures are no longer smooth and indefinite because the pressure to which the head is subjected, particularly during a uterine contraction, causes the cranial bones to overlap each other, and thus the sutures are rendered prominent and more readily palpable. In this overlapping the parietal bones regularly override the occipital and frontal bones and the parietal bone which presents anteriorly will overlap its fellow.

If, at this time, we view the lambdoid and sagittal sutures together, the relations between them resemble the letter "Y" (see Fig. 2), the two arms of the "Y" being formed by the lambdoid, and the stem by the sagittal suture. We also find that the portion of the skull between the two arms of the "Y" is the occipital bone and

that the stem is formed by the junction of the parietal bones. Close observation, as to the manner in which overlapping occurs, shows that the one which occupies the lowest plane (in other words, the bone that is the most depressed) is the occipital bone; and the one that is the least depressed is the anterior parietal bone; if the stem of the "Y" be palpated in the direction of the frontal bone, it will terminate in the anterior fontanelle.

The confusion that sometimes arises when all the sutures of the posterior fontanelle appear to radiate from a central point within the dilated cervix (see Fig. 3) may be cleared away when it is remembered that an examination during a uterine contraction will disclose the occipital bone as the one most depressed.



FIG. 3.

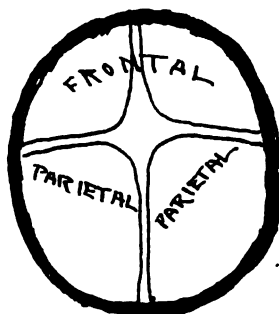


FIG. 4.

The most favorable time to diagnosticate the position of a vertex presentation is immediately after the rupture of the membranes. Prior to that, each uterine contraction is accompanied by a bulging of the bag of waters over the sutures which renders palpation of them difficult, to say the least. Delay in labor following rupture of the membranes, favors the formation of a caput succedaneum which will prevent palpation of the sutures. An extensive caput succedaneum is not infrequent in occipitoposterior positions of the vertex because of the prolonged second stage of labor. However, palpation of the sutures beyond the boundary of the caput succedaneum will mark their location, and continued pressure with the finger on the edematous scalp will not only enable one to follow the sutures throughout their course but to determine which bone is the most depressed. A correct diagnosis may thus be made.

An incomplete flexion of the vertex, in cases of occipitoposterior positions may approach a brow presentation. This is not infrequent but it is a condition that belongs to the early part of the

second stage of labor. It may occur also if the head is retarded and extension follows flexion during the second stage of labor. If this takes place, the anterior fontanelle is then substituted for the posterior (see Fig. 4). We now find the depressed occipital bone if we follow the suture that points most directly backward; or if we follow the suture running in the opposite direction, the finger will come in contact with the bridge of the nose and the orbital arches may be felt on either side of it. As a last resort, the finger may be

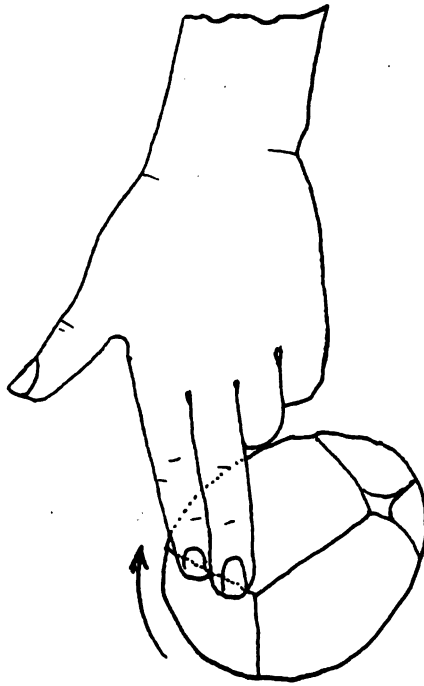


FIG. 5.

passed to and fro over the ear of either side. The finger passes readily over the ear in moving *toward* the occiput but it encounters resistance in passing from the occiput.

*Rotation.*—As the diagnosis is made, the anterior arm of the lambdoid suture will be found to be the most prominent of the three parts of the letter “Y,” because of overlapping of the anterior parietal bone, which, in turn, overlaps its fellow. If the occiput is to the right and posterior, it may be advantageous to use the left index or middle finger, or both, and with the palmar surface hook, as it were, onto the bony ledge of the anterior arm of the lambdoid

suture and endeavor to move it upward or forward in the direction in which the occiput should rotate (see Fig. 5). The amount of force that may be applied to the head in this maneuver is executed during a contraction of the uterus. At that moment there is a tendency for the head to yield to the rotating pressure exerted by the fingers. If the occiput be to the left and posterior the same fingers of the right hand should be used for this maneuver (see Fig. 6).

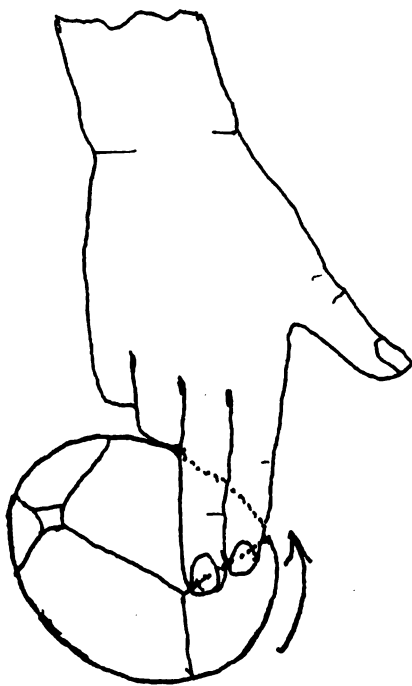


FIG. 6.

Rotation, when it occurs, is gradual and may be very slow. Almost invariably it means a prolonged second stage of labor. Anterior rotation of the occiput is, as a rule, accomplished after it has reached the pelvic floor. The pelvic floor constitutes the opposing force from below which the descending head must overcome; it is the condition which brings about spontaneous anterior rotation of the occiput.

It is rare to find the occiput directly posterior associated with the embarrassing condition which does not enable us to determine in which direction rotation should be attempted; but should

this condition arise, tentative efforts at rotation may be undertaken to ascertain in which direction the head is apt to yield to the pressure made upon it by the fingers. This maneuver should always be preceded by abdominal palpation and auscultation in an endeavor to ascertain the exact attitude of the fetus in the uterus.

Failure at digital rotation does not involve an experiment that is costly. Not only the mother and child, but also the operator, will reap the benefit of the exacting diagnosis which this maneuver requires.



FIG. 7.

If forceps rotation and extraction are resorted to, the lambdoidal suture will be the operator's guide; the maneuver employed for digital rotation may be successfully used for maintaining the rotation secured by the forceps, during the time the instruments are removed and reapplied.

When the anterior fontanelle presents, through incomplete flexion of the head, the middle finger of the examining hand may be moved backward along the sagittal suture till the beginning of the diverging

lambdoidal arms are felt and the depressed occiput is reached; the palmar surface of the finger tip is then hooked into this depression, or notch, at this point and traction in the direction of the sagittal suture is made during uterine contraction (see Fig. 7). At the same time the frontal bone is pressed upward with the thumb of the operating hand. When flexion of the head is complete, the anterior fontanelle will have moved forward and the occiput will have been brought more nearly into the position occupied by the former. From this stage on, digital rotation of the occiput may be accomplished by the maneuver described above.

Some writers in commenting upon the efforts made to assist in the anterior rotation of occipitoposterior positions claim that the operator in these cases is only giving himself credit for something that would, probably, have occurred spontaneously. Be that as it may, those who observe the rotation of the occiput after resorting to the manipulations mentioned, may have the pleasure of witnessing an early termination of what otherwise would have been a much prolonged second stage of labor.

*Summary and Conclusions.*—1. The positive diagnosis of position is essential and is best made at the beginning of the second stage of labor, immediately after the rupture of the membranes and during uterine contraction.

2. Attempts at digital rotation before the vertex is engaged in the pelvis will usually result in failure because of the absence of conditions necessary for its success.

3. The application of digital rotation in occipitoposterior positions is most effective when made during uterine contractions and after the occiput impinges upon the floor of the pelvis.

4. Rotation should be gradual; the effort may have to be continued through several uterine contractions before the occiput remains fixed anteriorly.

5. Occasionally the occiput appears to be more freely movable when the uterus is relaxed; but, at this time, the fingers cannot assert their full power at rotation, because of the tendency to slip off of the bony ledge through upward displacement of the vertex.

6. After rotation, time for remoulding of the head should be allowed in order to secure the lesser diameters of it for delivery.

7. Digital rotation, in conjunction with the use of the forceps, is of assistance. By this procedure the rotation obtained by the forceps may be maintained during their removal and reapplication.

8. No risk to mother or child is incurred through failure of attempts at digital rotation.



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OBSERVATIONS ON PREMATURE SEPARATION OF THE  
NORMALLY SITUATED PLACENTA IN THE  
LATTER MONTHS OF PREGNANCY.\*

BY

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New York.

THIS accident has been recognized and differentiated for more than a century, but only within very recent years have the frequency and dangers been generally appreciated.

Premature separation of the normally situated placenta vies with placenta prævia in clinical importance. In the last 60,000 histories at the Lying-In Hospital there are recorded 164 cases of premature separation of the placenta, or one in 336. In the same series placenta prævia is recorded 368 times, or one in 163.

In a recent and comprehensive article, Professor Williams traces the development of our modern knowledge of this subject, and leaves the subject where little new can be advanced at present, except perhaps the discussion of certain phases of the accident.

During the past thirteen months the writer has had five cases of this accident under his personal care in the service of Dr. A. B. Davis. In one instance the condition occurred twice in the same patient. As this group of cases illustrates several clinical types, the writer begs to present the histories as an introduction to a discussion of some phases of this interesting and dangerous condition.

\* Read before the Twenty-ninth Annual Meeting of the American Association of Obstetricians and Gynecologists at Indianapolis, Ind., September, 1916.

CASE I.—Mrs. S., No. 31700, aged thirty-four, para-vi; strong large framed Irish woman; at, or very near term; good health; no abnormal symptoms during her pregnancy. In the afternoon of the day before her admission to the hospital, one of her children was severely injured in the street and the patient, who lived in a top floor tenement, ran up and down stairs a number of times. About midnight she began to have severe and steady pain in the abdomen and back. They were not like labor pains. The pain continued during the night, and at nine o'clock in the morning the patient suddenly passed a large blood coagulum and a considerable quantity of fluid blood. About an hour later there was a second gush of free blood and coagula. A physician was called, and the patient brought to the hospital shortly after. On admission, the patient was bleeding considerably. Her condition was poor, the uterus very large, *the fundus measured 44 cm.* above the symphysis, and the uterine consistency was very firm. The os admitted three fingers and the membranes were intact. The vertex presented, but was only partly engaged in the brim; fetal heart not audible.

The patient was delivered by version as quickly as possible. The child appeared to be full-term, and had been dead for some hours. The cord was around the body and under one arm. The placenta was almost completely detached and surrounded by a large amount of clot. The large uterus had little or no contractile power, and the patient died in a few minutes from hemorrhage and shock.

No autopsy was made, but a postmortem exploration of the uterus revealed a distended and relaxed cavity. Firm intrauterine gauze packing had had little or no effect in promoting contraction of the organ.

This case represents a frequent type: Multiparae, usually with a history of three or more pregnancies, relaxed tissues, and a history of overexertion or slight trauma. The onset of the development of a retroplacental hemorrhage is marked by pain in the abdomen and back, symptoms of shock to a greater or lesser degree, and tonic contraction of the uterus.

It will be noted that in this case nine hours elapsed between the first symptoms of retroplacental hemorrhage and the appearance of blood externally. The lack of contractile power of the uterus after delivery of the child, as observed here, is a frequent complication in cases in which the retroplacental hemorrhage does not find a ready outlet, and infiltration of the uterine muscle results in impaired contractile power of the organ.

CASE II.—Mrs. T., No. 31846, aged thirty-six, para-ix; a rather obese Irish washerwoman of the hardworking type. She was at the beginning of the last month of pregnancy and had felt well until the evening before her admission to the hospital, 12:30 A. M. During the two preceding days she had been doing very heavy washing.

On the evening of her admission she began to have pains in the abdomen and back, and believed herself to be in labor. An examination showed the cervix obliterated, the os slightly dilated, the membranes intact, and breech presenting. The uterus was tonically contracted, and very tender to the touch. The patient complained of constant pain in the uterus and severe headache. The fetal heart could be distinctly heard. General condition of the patient good. Four hours after admission external bleeding began, chiefly in small dark clots. Cervical dilatation was slow; the patient's general condition and the fetal heart remained good. During the following six hours external bleeding was very little, and the condition of mother and child did not suffer. At the end of this period, however, the patient had a sudden and profuse hemorrhage.

The os now admitted four fingers. The membranes, which were still intact, were ruptured with the intention of delivering the child at once, but, immediately after the rupture of the membranes the uterus contracted promptly and the child was born spontaneously except for the usual manipulations in delivering the after-coming head. The placenta and a large quantity of dark coagula followed the expulsion of the child. The uterus contracted normally, and there was no excessive postpartum bleeding. The puerperium was uneventful. The child, which weighed 2300 gm. at birth, died on the second day. The autopsy diagnosis was atelectasis. It is evident that in this case the placental separation was not very extensive shortly before the termination of the labor. The placenta became suddenly and almost completely detached just about the time the membranes were ruptured.

CASE III.—Mrs. D., No. 31837, aged twenty-two, para-i; Austrian Jewess, medium stature and good health; four to six weeks from term. Twenty-two hours before admission to the hospital, she fell heavily against the rim of the bath tub, striking her abdomen and left forearm. This was followed at once by discomfort in the abdomen, which grew worse and in three or four hours the patient was having severe abdominal pain with cramp-like exacerbations and severe backache. The pain continued and six hours later, or ten hours from the time of the fall, she began to bleed from the vagina; the bleeding was not profuse, but continuous. When brought to the hospital, twenty-two hours after the accident, she was nearly exsanguinated, and mildly delirious. There was still slight bleeding from the vagina. Examination showed an unobliterated cervix barely admitted one finger; placenta could not be felt. The size of the uterus indicated an eight months pregnancy and was tonically contracted. Fetal heart inaudible. A small vagina and unobliterated cervix determined the decision of making an abdominal hysterotomy, in spite of the fact that there was no evidence of fetal life.

The blood count on admission showed red cells, 2,210,000; white cells, 13,200; polymorphonuclears, 80 per cent.; hemoglobin, 33 per cent. Just before the operation was started, an intravenous saline infusion was begun, and 0.75 c.c. of pituitrin, m. 25 of ergotol

and  $\frac{1}{8}$  grain of morphin were given at the same time. Ether anesthesia was continued during the operation; the amount of ether required was small. The uterus was found firmly contracted, somewhat distended and of a deep purplish red color showing numerous petechial areas. The broad ligaments, tubes and ovaries were not examined. There was no free blood in the peritoneal cavity. After opening the uterus the placenta was found almost completely separated in the region of the fundus. The dead fetus, placenta and membranes, and a great quantity of coagulated blood were quickly removed, and the uterine incision closed. The uterine musculature seemed softer than usual, deeper in color, and infiltrated with blood. The uterine wound scarcely bled. The womb contracted well. After the operation the patient received a stimulating enema and was returned to bed. The child weighed 1890 gm., bore the evidence of having been dead for some time. The round placenta measured 16 by 16 cm., and the detached surface was almost entirely covered with loosely adherent blood coagula. The patient rallied from the operation in twelve hours. She was very weak the following day, and slightly delirious.

Blood examination twenty-four hours after operation showed: Red cells, 1,500,000; white cells, 14,800; polymorphonuclears, 87 per cent. and hemoglobin 25 per cent. A Lindemann blood transfusion of 520 c.c. was made twenty-four hours after operation. Considerable improvement in the patient's condition followed this procedure. Blood examination twenty hours later showed: Red cells, 3,000,000; white cells, 17,200; polymorphonuclears, 85 per cent., and hemoglobin 42 per cent. The patient continued to improve, although the blood picture did not show much change, except that the total and differential leukocyte counts became normal. After six days, both the red cell count and hemoglobin began to increase. The temperature was normal on the fifth day, and remained so thereafter. The highest temperature recorded was 101°. The abdominal incision healed by first intention. Involution of the uterus proceeded normally. The lochia had practically ceased on the tenth day, and the patient was discharged three weeks after the operation. The subsequent history of this patient is:

CASE IV.—About four months after leaving the hospital this patient, Mrs. D., again became pregnant. Except for minor digestive disturbances during the early months the pregnancy progressed normally. At the end of the seventh month, she went to bed feeling perfectly well. At five o'clock in the morning she was awakened by pain in the abdomen which soon became very severe and caused her to faint. She was brought to the hospital soon afterward with all the symptoms of severe internal hemorrhage. The uterus was tonically contracted. Extensive dullness on percussion in both flanks indicated the presence of considerable free fluid in the peritoneal cavity. A small amount of blood issued from the undilated cervix.

Hysterotomy was performed immediately. The abdomen was opened through the former incision. Exposure of the uterus showed

that the former uterine incision had ruptured in its entire length. The placenta protruded through the rent. The membranes were unruptured. A seven months fetus, placenta and membranes, were promptly delivered.

The uterine scar was excised and fresh edges sutured in layers with chromic catgut. The uterus contracted well. A part of the partially clotted blood in the abdominal cavity was removed and the abdominal incision closed after excising most of the cicatrix of the previous incision.

The patient made a good recovery and was discharged in good condition on the twenty-third day. Involution of the uterus was well advanced and the organ free from tenderness and adhesions.

Examination of the placenta immediately after the operation revealed the following interesting condition: Shape oval; measurements,  $14 \times 17$  cm.; in the center of its maternal surface was a dark, adherent blood clot  $7 \times 8$  cm. in area and 1 to 2 cm. in thickness. This coagulum was sharply defined and was the product of the retroplacental hemorrhage which occurred before rupture of the uterus took place.

Inspection of the excised uterine scar showed it to be thin in several places; the rest was  $\frac{1}{2}$  to 1 cm. in thickness. Sections made from various parts, and examined microscopically, show good fibromuscular structure free from deep penetration of the decidua.

Findley, in a recent article on rupture of the uterus in Cesareanized women, speaks of the weakening effect placental implantation has upon the scar. In the above case, however, it appears that cicatrization was fairly firm and, as the patient had no labor pains to put a strain upon it, another explanation must be sought to account for the early rupture. To me it seems that the increased intrauterine pressure due to the retroplacental hemorrhage, is responsible for the accident.

Case V.—Mrs. Z., No. 31831, aged twenty-seven, para-i; Austrian Jewess, small stature; within two or three weeks of term. About fifteen hours before coming to the hospital she began to have pain in the back and believed herself to be in labor. Seven hours before admission she noticed slight bleeding from the vagina and which later became more copious. A physician was called who packed the vagina with iodoform gauze. He suspected placenta previa, and referred the patient to the hospital.

On admission her condition was fairly good, though she showed evidence of loss of blood. Pulse fluctuated between 100 and 110. The fetal heart was heard in the left lower quadrant and beat 140 per minute. The uterus was very hard and remained tonically contracted. The cervix, unobliterated and thick, barely admitted one finger. Placenta not palpable. Labor pains every four or five minutes. A small amount of fluid mixed with small coagula of blood escaped continually from the cervix; the flow increases with each uterine contraction. The uterus did not relax much between con-

tractions, and was very tender to the touch. The patient complained of constant and severe backache.

Presentation, vertex; head above the brim. The patient, small in stature, had a flat justomino pelvis of moderate degree. The true conjugate was estimated at 8.5 cm. When uterine contraction occurred the head did not come into the brim, but moved laterally in the direction of the left iliac fossa. The small pelvis, however, did not seem sufficient to explain the failure of the vertex to engage in the pelvic inlet. The child was obviously small, and the menstrual history brought the duration of pregnancy within two to three weeks of term. Watching the patient for a time it seemed that the bleeding, the tonic uterus, and the peculiar movement of the child with each contraction, could only be explained by some entanglement of the cord, and partial separation of the placenta.

Abdominal Cesarean section was elected as the quickest and most satisfactory method of dealing with the situation. The uterus was found normal in color and appearance. The child was promptly delivered. Two coils of cord about the neck of the child had held the neck and head close to the lower border of the placenta in such a fashion as to pull the edge of the placenta away from the uterine wall. The placenta was found attached to the left lateral uterine wall. The cord insertion was marginal at the lower edge of the placenta.

Subsequent examination of the placenta showed that it was oval, measured 14 X 17 cm.; placental separation extended over one-quarter of its area and occurred at the lower margin where the cord was attached. The cord was 43 cm. long. The child weighed 2690 gm.; it did well, and when discharged with the mother on the twelfth day, it weighed 2750 gm.

The puerperium was very satisfactory; temperature was normal on the second day and remained so to the end. Although some retroplacental hemorrhage had taken place for sixteen hours, the uterus was normal in color and appearance. This fact may be explained by considering the area of placental separation, which was low down, and permitted the blood to readily find an external outlet, thus minimizing its tendency to infiltrate the uterine musculature.

*Discussion.*—There are various generally recognized factors in the etiology of premature separation of the normally situated placenta, among the most important of which are toxemia, trauma, short cord or long cord rendered relatively short when wrapped about the neck or body of the fetus, overexertion, local disease, and the normal retrograde processes appearing toward the latter part of gestation. There is little in the known etiology which might enable us to guard against the accident.

*Mechanism of the Condition.*—When under the influence of any one of the causes mentioned a slight separation of the normally implanted placenta occurs, the space created thereby between the

placenta and the uterine wall will be filled up by blood from the mouths of the uterine vessels opening directly into this retroplacental cavity.

I beg to digress at this point into the realm of applied physics, and describe an hydraulic press. This is a press operated by the pressure of a liquid, under the action either of gravity or of some mechanical device, as a force pump. It depends on the law of hydrostatics that any pressure upon a body of water is distributed equally in all directions throughout the whole mass, whatever its shape. In the more common forms the pressure of a piston upon a body of water in a cylinder of small area is distributed through pipes or openings to a piston of larger area, the statical force being thus multiplied in the direct ratio of the areas of the pistons. Thus, if the diameter of the small piston, A, Fig. 1, is one inch and of the larger piston, C, Fig. 1, in cylinder B, is one foot, the area of C will be 144 times that of A; and if a load of one ton is applied to A, C will exert an upward statical force of 144 tons.

Suppose that the aggregate area of the mouths of the vessels opening into the region of retroplacental separation equals 1 square inch, and the blood pressure therein is 120 mm. of Hg., and suppose, for example, that the area of placental separation is four inches square, giving sixteen square inches, and this area occupied by fluid or semifluid blood, by the laws of hydrostatics, a pressure of 120 mm. of Hg. in a 1 square inch source would yield over this sixteen square inch area a thrust or jacking force of  $16 \times 120$ , or 1920 mm. of Hg. If the membranes be unruptured, this force will be transmitted equally to all parts of the uterus.

The statement has been made repeatedly that the retroplacental hemorrhage acts as a foreign body, and thereby stimulates the contraction of the organ. In view of the mechanical principles involved, I believe this view to be erroneous, and that the tonic contraction of the uterus constantly observed in this accident represents a mighty and prolonged effort on the part of the uterus to resist a disrupting force within it. An appreciation of the degree of that force makes it easy to understand the infiltrated and disorganized state of the uterus and even of the other pelvic structures so frequently observed and reported in cases in which the hemorrhage remained "concealed" for any prolonged period. The sooner the hemorrhage secures an external outlet, the sooner will the disrupting force within the uterus be reduced or minimized.

In Case V, where the lower edge of the placenta was separated by traction on a cord inserted at the margin of the placenta, no infil-

tration of the uterine tissue was observed when Cesarean section was performed, although retroplacental hemorrhage had been going on for sixteen hours. In this case the blood escaped readily from the uterus, and no great disruptive force was developed within the uterus.

In Case III, in which the patient fell in the bath tub, the retroplacental hemorrhage remained "concealed" for ten hours, and after that only a partial external outlet was established. In this case the uterus was markedly infiltrated, although the organ did contract satisfactorily after the Cesarean operation. In the subsequent history of this case, a fairly firm Cesarean cicatrix ruptured within two hours after the onset of a retroplacental hemorrhage from increasing intrauterine pressure.

In Case I, delivered by version, the retroplacental hemorrhage was "concealed" for nine hours; the contractile power of the organ was so diminished by the consequent overdilatation of the uterus that the patient's death must be attributed chiefly to this condition. An important point here is the mechanics of this condition. A matter of repeated clinical observation also is the fact that, when the retroplacental hemorrhage develops before the onset of labor, there is little or no tendency toward dilatation of the lower uterine segment. These patients rarely deliver themselves, unless labor is well started before the retroplacental hemorrhage begins. A thorough appreciation of this fact would save the life of many parturient women. We have ample grounds then to consider every patient, the victim of this accident before the onset of labor or early in labor, one of internal hemorrhage, pure and simple, and to treat the case accordingly. The expectant treatment in ruptured ectopic gestation has been abandoned; cases of *ablatio placentæ*, with the exception of those developing when the patient is in active labor, might well be placed in the same category.

*Diagnosis.*—The physical signs and symptoms of this accident are very definite. The hard unrelaxing uterus is characteristic; it is present and persistent from the onset whether the hemorrhage is concealed or not. Pain in the uterus and severe backache, accompanied by more or less shock, are pathognomonic symptoms. *Placenta previa* and spontaneous rupture of the uterus are the only conditions with which *ablatio placentæ* might be confused. Differentiation is not, as a rule, very difficult.

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116 EAST 63D STREET.

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## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

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*Meeting of October 5, 1916.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

*(Continued from February.)*

DR. JOHN A. KOLMER.—I feel that the question raised by Dr. McGlinn and emphasized in my former remarks is one of vital importance, namely, that the Wassermann test is not yet sufficiently delicate to detect the true percentage of syphilitics among women in whom syphilis is the cause of their abortion. Dr. Montgomery's claim is timely and shows that we cannot rely too much on the therapeutic test. I can only state that in a case similar to the one cited by Dr. McGlinn in which the Wassermann reaction was repeatedly negative, it is good practice to test the Wassermann of the patient after she had been on antisyphilitic treatment for some time.

The question raised by the Chair is also one of great importance. There is no doubt but that the Wassermann reaction varies in results in different laboratories. To those doing serological work the answer is just as plain as the nose on one's face. No other result could be expected because the Wassermann reaction is different from most other reactions. The result is dependent not only upon the accuracy and care of the worker, but upon the biological sensitiveness of the reagents. This is bound to vary in different laboratories and the results, particularly with the sera of patients containing small amounts of the antibody, are bound to vary. The only way to overcome these difficulties is to have a standardization of the Wassermann reaction so that we shall know what is best in the technic and induce all workers in this method to accept it.

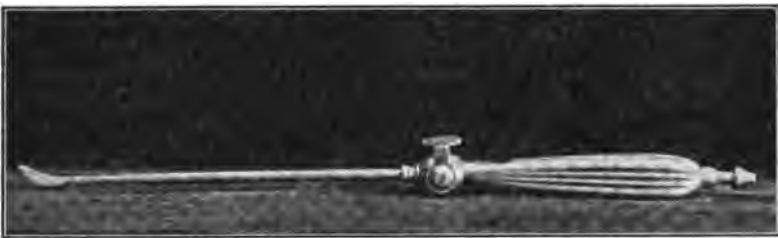
I believe the Chair has been puzzled at times in interpreting the results of my Wassermann reactions on his patients in the Polyclinic Hospital. This is due to my practice of employing three different antigens with each serum including a cholesterinized alcoholic extract of heart. Not infrequently the reactions are negative with an antigen of syphilitic liver and acetone insoluble lipoids of heart and positive with the cholesterinized antigen; experience is teaching me more and more conclusively that these reactions with the cholesterinized antigens are true reactions and indicate their greater delicacy, all of which we maintain is highly desirable not only in the diagnosis

of the obscure and difficult case but also as a serological guide in treatment.

DR. P. BROOKE BLAND showed a

COMBINATION DRY AND DOUCHE CURET.

The instrument that I have to exhibit was designed because we felt it would supply certain needs that ordinarily are lacking in the common uterine curet. This instrument places the control of the flow of the irrigating solution under the direct control of the operator, and by having the stop-cock placed in the handle of the curet, as you notice in this instrument, the fluid can be turned on or off instantly, and at the surgeon's will. Therefore, the instrument may be used either as a dry or an irrigating agent. In addition it is a conservator of time, because the operator is not compelled to await the pleasure of the nurse to release the flow of fluid by removing the usual compression forceps, or by manipulating a stop-cock. This instrument also overcomes the annoying changes that occur in



rubber tubing when compression clamps or hemostatics are used. It offers another advantage furthermore, because the blade of this curet is always parallel to the thumb control, so that the operator is always certain of really cureting the uterus and not merely rubbing the endometrium with the back of the instrument, as is so frequently done with the curet now in use.

DR. GEORGE E. SHOEMAKER

EXHIBITED A LARGE FIBROID.

The interest attached to this case is that the tumor was complicated in various ways. The woman weighed 235 pounds. She had an umbilical hernia which was irreducible and was at a level below the pubes when the woman stood up. The tumor was, therefore, in the upper abdomen and not the lower. It was thrown out of the pelvis by its size so that the diagnosis from below was interfered with. The only way we could judge that the tumor differed from a cyst was its firm consistency and the fact that the woman had had it for a number of years and that she was bleeding. Her hemoglobin was 31. She came into the hospital with sepsis; with a temperature of  $102\frac{1}{2}$ ; pulse 144; respirations 44, although that very rapidly subsided

with rest in bed. She had had dyspnea, fever and weakness for two or three weeks before admission. The woman had had six children and must have had some of them when this fibroid was present. She had had the tumor since 1905 and had had several children since that time. The urinary output was low; the specific gravity of 1006 and 1009 gradually came up; the hemoglobin rose from 31 to 41. Hysterectomy was done and she has made an excellent recovery. The weight of the tumor is 25 pounds. The cause of the fever was the degeneration of the fibroid, which was undergoing an early form of necrosis with hemorrhagic infarction.

What to do with umbilical hernia in the presence of a bad fibroid is a problem. My experience has led me to dread under taking the cure of a reducible hernia when doing an operation. In this case I made the incision to the left of the hernia in the median line and ignored the hernia with the happiest results. Another question arising is, shall we operate in the presence of septic fever. This we all try to avoid. In this case, rest in bed, administration of water, etc., temporarily arrested the absorption of any toxic material which might have been entering the blood, and we had an interval of improvement during which I operated.

Dr. JOHN A. McGLINN presented the report of

#### TWO CASES OF MYOMECTOMY IN PREGNANCY.\*

\* See original article, page 406.

## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

*Meeting of November 14, 1916.*

*The President, DR. JOHN O. POLAK, in the Chair.*

DR. F. R. OASTLER presented three specimens and case reports in a discussion on

### WHAT CONSTITUTES MALIGNANCY IN OVARIAN CYSTS?

CASE I.—A. W., aged thirty-five, family history negative, menstrual history normal, married at the age of thirty; first and only child at thirty-one. Present illness: For the past one and one-half years has noticed a mass in the lower abdomen gradually increasing in size. General condition good, no loss in weight, color good. Operation, laparotomy, removal. Diagnosis, papillomatous cyst of ovary.

CASE II.—G. H., aged sixty-five, family history negative, menstrual history normal, married at twenty-three, three children born without incident, menopause at fifty-five. Present illness: For seven years had noticed a gradually increasing mass in the lower abdomen, color pale, considerable loss of weight and strength and all the evidences of cachexia. Operation, laparotomy, removal. Diagnosis, multilocular cystadenoma of ovary.

CASE III.—H. W., aged thirty-two, family history negative, menstrual history: amenorrhea for four months, married at twenty-five, one child without incident. Present illness: Went to her physician to find out if she was pregnant, health excellent, no loss of weight or strength. Operation laparotomy, removal of cyst. Diagnosis, pseudomucinous cyst of ovary.

Here are three cases of three different kinds of ovarian cyst, the two malignant forms giving no evidence of malignancy and the one simple form presenting all the evidence of malignancy. The patient with the pseudomucinous cyst is well two years after operation and no evidence of the secondary cysts which could not be removed at operation. We all know how some papillomatous cysts are apparently malignant while others do not appear to be so, also how some apparently simple cysts develop malignancy. I beg to offer the following questions for discussion.

1. What constitutes malignancy in ovarian cysts? (a) Are we to depend upon laboratory reports or (b) operative findings or, (c) is there some other way of discovering malignancy?

2. Are there intermediate grades of malignancy between cystadenomata or carcinomata?

3. Do not all cystomata have a common origin as teratomata?
4. Do metastasis spread by (1) lymphatics, (2) blood-vessels or (3) direct extension?
5. Should cysts be removed with or without tapping?
6. Should all cysts, large or small, be removed?
7. Should not the other ovary always be removed?

## DISCUSSION.

DR. L. W. STRONG (in opening the discussion).—To discuss this very complicated matter would really require going back to the physiology as well as the pathology of the ovary. The first thing I would like to say is that the ovary is especially sensitive, or especially liable to all sorts of chronic irritative lesions, such as those due to sexual life, those due to parturition and all things that lead to the hyperemia which is so frequent in the ovary. Now, as the result of all of those irritants in general, the ovary is especially liable to proliferative changes of one sort or another.

The next thing one should bear in mind is that the ovary is especially liable to form cysts of all types. That is very natural, considering the follicular apparatus which is so abundant in the ovary, and I cannot agree with Dr. Oastler's idea of classing all neoplasms of the ovary as teratomata, for surely the simpler forms of cysts are dilatations or simple hypertrophies of the follicular apparatus. Those merge insensibly into the cystomata of the ovary some of which also are dilatations of the follicular apparatus, and there is no histological basis where the border line is passed or what the border line is. In fact, it is gravely stated in some of the handbooks of gynecological pathology that if the cyst is larger than the ovary itself it should be classed as a cystoma, but otherwise it should simply be regarded as an inflammatory structure and not a neoplasm. That will show you the absurdity of trying to make a differentiation between cystoma of the ovary and a simple dilatation cyst of the ovary.

The next thing to bear in mind is that all cystomata are adenomata. That puts them at once in a peculiar category because adenomata stand in a very peculiar relation to other tumors. Adenomata themselves are simple and nonmalignant.

When one comes to discuss malignancy one finds at once that this is a clinical differentiation and that there is no histological or other definite basis in the determination of malignancy. These adenomata are peculiar in that they do show characteristic transitions into the carcinomata, and at once we must see that it is not to be supposed that a histological basis will show the criterion between the carcinoma and the adenoma. It is impossible. I do not agree with Dr. Oastler, or possibly Dr. Oastler did not intend to imply that the pathological basis should not be the accepted one because the pathological basis is the only one. The clinical manifestations are, of course, all referred to the pathological picture or the histological picture at least. One does not wish to give the impression that a carcinoma is a definite entity and that it is possible to draw a fixed line where a thing is a carcinoma and another thing is not a carci-

noma, but it is true there is a stage where it is becoming a carcinoma—where a thing, obviously not a carcinoma, is becoming a carcinoma, so I will end by saying that although I think the histological basis is the only one which can be depended upon, still each case must be judged by itself.

DR. BROOKS WELLS.—My personal belief is that every ovarian cyst is potentially malignant and should be removed. If, at operation, an ovarian cyst is found to be free from adhesions, is not intraligamentous, is free from papillomatous growths on its outer surface and does not show any evidence of perforation, there is little likelihood of the cyst recurring, no matter what the pathologist finds inside of the cyst afterward. However, if there are adhesions, if the papillomatous masses have penetrated the cyst wall, or if a pseudo-mucinous or papillomatous cyst has perforated so as to contaminate the peritoneal cavity, it is extremely liable to recur and it may do so even if the pathologist reports it histologically benign.

DR. H. J. BOLDT.—I think one of the best illustrations I can mention to-night (as regards the question of malignancy) is an instance which occurred in my practice very recently. I operated upon a woman and did not suspect anything in the way of a serious condition except myoma, and as a complication there was an ovarian tumor which was a little larger than a hen's egg; the other ovary was also slightly enlarged. The pathological report read "primary adenocarcinoma with metastasis of the opposite ovary and of the Fallopian tube." Now that brings up very forcibly the point which has just been made that while it is known that the majority of these cysts are not malignant it is very difficult to tell when they are malignant and when they are not malignant. How are we to tell at the operating table whether a cyst is or is not malignant? If one side is involved that is not a good reason for removing the ovary on the other side. Of course if one is sure that the opposite side is malignant why then remove that ovary. I do not coincide in the view that the ovary on the opposite side should always be removed unless there are gross macroscopical changes in it.

DR. H. N. VINEBERG.—I think it was only a short time ago that Dr. Boldt told us that in removing large cysts he always tried to save a portion of the ovary. I would like to ask him whether, in view of his recent experience, he still would do that?

DR. BOLDT.—No, I would not do it. I must reverse myself on that point, unless I have reason to believe that the ovarian tumor is benign.

DR. G. L. BRODHEAD.—Dr. Humpstone brought up a great many interesting points and one of them was the use of pituitrin. We gave up the use of pituitrin injected just before the incision through the abdomen was made because it seemed in some cases we had considerable difficulty in getting the child out, so we decided to use it just before the uterine incision was made and this plan works well. In this way we get the same result as Dr. Humpstone and avoid the possible chance of having the uterus contract while the child is being extracted. In suturing the uterine wound we have followed

the technic employed by Dr. Humpstone for several years and find it has given good results. I am not prepared to advise abdominal section in most cases of eclampsia beyond the eighth month. We have had a large series of cases at the Harlem Hospital. I cannot give the mortality but I believe in cases where we have used the bougie and bag together the mortality has been very low. Hysterectomy is not positively indicated in all cases where there is temperature. About two years ago I was called by a physician who had tried to induce labor with a bag and had not succeeded. I found a marked pelvic contraction with a temperature of  $103^{\circ}$  F. The fetal heart was loud and distinct and we performed the classical Cesarean section. The child was in good condition, but the liquor amnii in that case was foul. The uterus was sewed up and the patient made a good recovery with a stormy convalescence and breaking down of the abdominal wound. A few weeks ago, before the Sloane Alumni Society, I reported a case of normal labor following Cesarean section in which the patient had a true conjugate of 8 cm. and was anxious to have a normal labor. I agreed to allow her the test of labor if she would go to the Woman's Hospital, which she did. Her pains began at 11 P. M. Between 2 A. M. and 3 A. M. there was very little pain but about 3 A. M. the second stage began and at 3.45 A. M. she was delivered by an easy low forceps operation of a baby weighing  $9\frac{3}{4}$  pounds, with a biparietal diameter of 10 cm. I agree with Dr. Humpstone, however, that in cases of marked contraction of the pelvis with a large head, Cesarean section is practically always indicated.

DR. O. PAUL HUMPHSTONE (in closing the discussion).—Our experience in trying to prevent the formation of adhesions, by peritonealization of the uterine suture line, has shown the extra suture to have no value. We tried putting the omentum posterior to the uterus, to prevent its adhering to the uterine and abdominal scars, but it has invariably come back in front.

I neglected to state in the paper, that we had no ruptures of the uterine scar in subsequent labors, that we know of.

We have not observed Dr. Broadhead's difficulty with pituitrin in any of our cases.

DR. H. N. VINEBERG.—There is only one other point I would like to touch upon and that is the question as to whether with a large ovarian cyst it isn't wiser to make a large incision in every case and remove the tumor entirely without draining it. I believe it is.

DR. H. D. FURNISS.—I believe in making a big incision in these cases and taking the cyst out in its entirety. I operated on a case about four or five years ago of what appeared to be a large unilocular benign ovarian cyst. I didn't see the patient again for a year when she came back and pelvic examination then gave the impression that the whole pelvis was filled with plaster of Paris. There was extension into the abdominal wall and metastases could be felt all over the abdomen. That originally appeared to be a case of benign ovarian cyst. There were enormous masses on both sides with implantation all over the peritoneum and into the broad ligaments and

it was reported as malignant. Those were taken out. It is now five and a quarter years and she is still well. She had, clinically and pathologically, a malignant growth. The next year I had another case that had been operated upon twice for papillary cyst and both times the operation was incomplete. She had been tapped twice. I decided I would take a chance with her and I opened her up. Buried down in the pelvis with the remnants of the ovaries there were masses about the size of walnuts. They were taken out. She has never since filled up. Now after four and a quarter years she is still well. Both of these were clinically and pathologically malignant cases and yet they were cured by operation.

DR. LEROY BROUN.—Admitting all that the doctor has just said as to the possibility of malignancy and of the necessity for making wide incisions to remove these cysts *in toto*, I cannot quite agree with him. It is the experience of every one of us that the majority of cysts are not papillomatous, it is also our experience that we can empty through a moderate incision (not an incision up to the ensiform) these cysts without soiling the peritoneum or the abdominal wound edges. It has always been my habit to empty cysts before removal if of any size, those that are smaller I remove *in toto* through the incision. I believe a very large incision extending up to the ensiform is not only unnecessary, but it is a mutilation as well. I cannot see the sense in subjecting every patient to an extensive incision on account of the chance of the presence of malignancy.

#### DISCUSSION.

DR. OASTLER, in closing the discussion.—With respect to the remarks which Dr. Broun has just made with regard to his procedure I might say in premise that that is a procedure which I have always followed, but I think I am more or less inclined to change my method and remove the cysts *in toto*. I think the objection to Dr. Broun's remarks is that we cannot always tell whether these cysts are filled with fluid that can be entirely removed, and the question of the malignancy or nonmalignancy of the fluid is one which is certainly worthy of serious consideration. If the fluid is not malignant we are all right, but if, on the other hand, it should be malignant then we may possibly be all wrong. Sometimes it is possible to remove a great part of the fluid but there is often a lot left behind that will not run out through the canula. As soon as we remove the canula and close the opening, it has happened in my cases that the opening will leak before I get through with the removal of the cyst, so it seems to me that in tapping the cyst in the hope of getting all the fluid out, you will find it almost impossible not to soil the peritoneal cavity.

The question of extension of these cysts, by lymphatic, vascular or direct extension has not been brought out, but knowledge on this subject would in no small measure help to determine operative procedure.

DR. S. WIENER reported a

#### CASE OF SEROCOLPOS IN A CHILD.\*

\* For original article see page 308.



## DISCUSSION.

DR. GORDON GIBSON asked Dr. Wiener if this girl had measles or scarlet fever or other exanthemata which so often give rise to a vaginitis. The discharge would be dammed up by the preëxisting atresia.

DR. S. WIENER said that he could not answer Dr. Gibson's question satisfactorily. The only point in the child's history was a tonsillectomy a year before which, of course, would have nothing to do with this. They got no history of any infectious disease whatsoever.

DR. W. M. FORD.—It may be of interest to know that within the past year a girl eighteen years of age who had never menstruated was admitted to the service of Dr. Flint at the Woman's Hospital. She suffered from an acute retention of urine, and in the examining room I found an elastic abdominal mass extending to the umbilicus and a cystic tumor about the size of a baseball protruding from the vulva, with walls as thin as the ordinary fetal membranes. With a sterilized pin or needle this wall was scratched through and a large quantity of serous fluid which looked like urine escaped. I don't know how much fluid was evacuated, but it was at least a quart. The patient was returned to bed entirely relieved. Her family was very indignant when they learned that she had been operated upon without an anesthetic and they took her home that night. I have never heard what happened to her.

DR. R. B. TALBOT said that he saw such a case at Ridgefield, Conn., about ten or fifteen years ago, in which it was thought that the patient had a tumor which required immediate operation. Another doctor was called in to see the case and while a diagnosis of a tumor about the size of an orange in the right side of the abdomen was made, the second doctor was not sure whether he should operate or not, and upon asking Dr. Talbot for his advice as to what he thought should be done in the matter, Dr. Talbot suggested that a long hypodermic needle be passed up through the vagina. The vagina was practically closed and the hymen broken. The needle was introduced into the vagina and bloody mucus evacuated which kept coming very profusely until it had entirely disappeared.

The history in that particular was that the girl had been in an orchard about three days previously and was up on a ladder, the ladder slipped and she fell a distance of about six rungs when she caught herself and as she did so she felt excruciating pain in the right side. It was at first thought that the vermiform appendix was the seat of the trouble. She had been well previous to the time that she fell. She was a very stout girl for her age. The final result of the trouble was that the swelling went down and that was the end of it.

DR. CLARENCE R. HYDE read a paper entitled

## SOME FACTS REGARDING POSTOPERATIVE TREATMENT.\*

\* For original article see page 378.

## DISCUSSION.

DR. H. J. BOLDT (in opening the discussion).—On the whole Dr. Hyde's presentation impressed me very favorably, particularly that part where he speaks about the desirability of using small doses of morphine. Personally I do not find that I can omit morphine in my after-treatment during the first twenty-four to forty-eight hours and I do not know of anything that will give so much relief to a patient as a dose of morphine. As far as the early getting up of patients is concerned I can fully substantiate what has been said about that; the absence of thrombophlebitis in patients who are allowed up early has also been referred to by others. Dr. Mayo informs me that since they allow their appendicitis patients to arise early he had observed an absence of thrombophlebitis in nearly all of the cases. The sand-bag appeals to me and I think the divisions are an advantage. With regard to the question of backache I believe it is very largely due to posture. I have been impressed with the value of a pillow placed under the lumbar region during the entire operation and have observed that where that has been done backache is not subsequently liable to be such a prominent symptom. I have had no experience with the olive oil. On the whole, the subjects mentioned by Dr. Hyde are very apropos and are worthy of a trial.

Before concluding I desire to add another case to the one with regard to the appendix and the point relative to giving of enemata. I had such an experience myself about fifteen years ago and since that I have given particular instructions that no enema should ever be used during the first three days if any surgery on the intestines had been done. In that case an enema had been given without my knowledge within twenty-four hours after an appendectomy in connection with other abdominal work which I did, and we found a soap-suds enema in the abdominal cavity when the autopsy was made.

DR. DOUGAL BISSELL.—I am in accord with most of what has been said by Dr. Hyde. I should like to call the attention of the Society to the fact that Dr. Brettauer, one of our members, spoke before this body in 1892 or 1893 regarding the administration of morphine after laparotomies. At that time it was the custom to withhold morphine in these cases. We are greatly indebted to Dr. Brettauer for the emphasis he laid upon the advantages in administering morphine to the point of relief. I have followed that practice ever since and my rule is to give these patients  $\frac{1}{4}$  grain on coming out of ether and continue its administration usually in smaller doses for several days if necessary or until the patient is relieved of pain. I differ from Dr. Hyde in regard to the usefulness of the sand-bag. I go to the other extreme, perhaps, and advocate a loose bandage that the intestines may have absolute freedom for motion. Dr. Hyde spoke of the necessity for placing something over the abdomen to replace the pressure where a large tumor, for instance, has been removed. I recall to mind the largest tumor I ever removed weighing from 35 to 40 pounds. In that case I put nothing over the abdomen except a small amount of cotton. Such a bag as Dr. Hyde advocates might encourage the expulsion of gas and give comfort in some cases, but I am

by no means convinced that the use of such a weight is advantageous. In my cases I insist that the binder be cut when gas collects in the intestines to give absolute freedom for intestinal motion. In regard to the olive oil I have never had any experience with it. It may be serviceable but seems to possess certain objections, namely, its administration and expulsion. As postoperative vomiting is practically never an annoying sequelæ in my cases, the administration of oil as routine practice does not appeal to me. With regard to the fourth point, namely, the rectal tube, I seldom use it as I find greater satisfaction in the simple enema.

DR. H. D. FURNESS.—I believe most of these backaches are postural and not due to distention of the abdomen with gas. I find the best support is obtained by putting the bag just above the knee in this portion here (indicating the lower third of the thighs) to relieve the marked lordosis, and at the same time it makes the operation very much easier by relaxing the abdominal muscles. I do not think that support under the back is so essential as it is if placed down below. Another point: in cases with special nurses and where I don't want the patients to get up early, on the third or fourth day I begin passive motion of the arms and legs and after the fifth or sixth day they have resistance exercises, and in that way they get almost the same result as if they were up and actually going about.

DR. J. M. MABBOTT.—I fully approve of the paper with a mental reservation, however, as to the first step. With regard to the olive oil, I would raise the question of the desirability of exciting this rather violent expulsive vomiting shortly after an abdominal operation. I appreciate the fact that the hospital staff is better qualified to pass judgment on that point than I am, but there are some theoretical objections. In regard to the further vomiting it seems to me that the morphine is particularly serviceable, as has been demonstrated by Dr. Hyde and his colleagues, in controlling this very disagreeable feature of postoperative cases.

As a surgeon of a passenger steamship for a period of over a year I found that in cases of uncontrollable sea-sickness I could secure for these people five or six hours' rest during the night by the hypodermic administration of  $\frac{1}{4}$  grain of morphine. I believe the diminishing doses employed by Dr. Hyde help in the control of the vomiting. The only precaution which I think one should take into account is to know whether or not any of the patients might have been a victim of the habit. In such patients I believe in withholding the drug as I understand even small doses are liable to start a craving for morphine again.

DR. HERMANN GRAD.—I am fully in accord with Dr. Hyde's views about the use of morphine after operation. I think the patient should have enough morphine to quiet the pains. I never keep the abdominal binder tight after the first twelve hours. With regard to the olive oil, I have known of this method of treatment for some time and I have tried it. The nurses found some difficulty in having the patients take it and for that reason it was not carried out long enough for me to come to any definite conclusion as to its value. There is

one thing that has not been mentioned this evening and that is the use of pituitrin after abdominal section. I find the use of pituitrin very serviceable indeed. I find that by its administration we not only have free expulsion of gases but we do not have to catheterize our patients so frequently. It is helpful in obtaining a satisfactory bowel movement with very much less trouble, less catharsis and less enemata than if the pituitrin is not given.

DR. LEROY BROWN.—I would like to ask Dr. Hyde to please tell us how the patients are prepared for operation in abdominal section. How is the intestinal tract prepared if any preparation is given, and I also wish you would tell us very much more fully the action of the sand-bag in keeping down the distention?

DR. OASTLER.—I rise to offer two pleas. One is, don't let us establish fixed rules for the after-treatment of our laparotomy cases. It is a very great mistake to do so. I remember when I first graduated from the College of Physicians and Surgeons it was impressed upon me that I should always give, following laparotomy, calomel in quarter-grain doses, 8 doses, one every fifteen minutes, to be followed by Epsom salts. This fixed rule was so ingrained in my mind that it took the longest time and experience before I forgot it. I believe every patient is a law unto himself or herself. I think no fixed rules apply and I believe none should be made. I think we have to adapt our rules absolutely to our patients and not our patients to our rules, and in the adoption of these suggestions I believe the same thing applies. For instance, the use of the rectal tube. I have passed rectal tubes for years with questionable result. Again, the question of administering olive oil after laparotomies I think open to objection, for the administration depends largely upon your patient. In the matter of the abdominal bags; what does a woman do who has been out and eaten a heavy dinner with resultant distention with gas? When she goes home she immediately opens her corsets. She wants freedom. I think the same thing applies equally well to gas following laparotomy. Even a binder is often the subject of complaint. On the other hand, we have to have some support to the abdomen so we must use the binder in spite of the discomfort, but why the sand-bag. With regard to the lubricant for the catheter I do not think that it has any influence on a possible cystitis and I do not agree with Dr. Hyde that any solution that he might use to lubricate the catheter will help to prevent cystitis. Another thing, the tendency to blame the nurse or the interne for the appearance of cystitis or to think it is the result of contamination from a dirty catheter is in a great measure wrong. Experimentation has shown me that the bladder often contains the colon bacillus, staphylococcus and other harmful bacteria, and that cystitis does not depend so much upon contamination by a negligent nurse or unclean catheter as upon the traumatism caused by the act of catheterization and the resultant infection by the contained bacteria. To bear me out in this I wish to say that I have taken 250 or more catheterized specimens of urine and upon examination have found that 50 per cent. of these urines have colon bacillus, staphylococcus or other

infectious organisms, so it simply means that in these cases if the woman has any irritation of the bladder she is apt to get up an infection merely because the organism is present in the bladder at the time of irritation.

In conclusion I would like to present a second plea. A great many of our gynecological patients are nervous women and a great many have symptoms of hyperacidity of the stomach and other gastrointestinal ailments. Therefore, it seems to me that one of the most essential features is to find out the condition of the whole alimentary canal before operation and treat your alimentary canal according to the way you happen to find it before operation rather than to adopt a whole lot of rules in treating it after operation.

DR. HYDE, in closing the discussion.—The preoperative catharsis consists simply of 2 ounces of castor oil in the afternoon of the day preceding operation. If the bowels do not move well from this an enema is given. We speak no more of high enema or low enema in the Long Island College Hospital. We simply say enema.

As regards the olive oil: it is given to empty the stomach and it does. It is given to make the patient vomit. How it makes the patient vomit I do not know. With regard to the remarks of Dr. Grad in the matter of the difficulty which he says he experienced in getting the nurses to give the olive oil, I wish to say in this connection that I have followed this method personally and successfully in 100 cases. The doctor says it is hard to get new nurses coming in to give the oil. My method is to explain how to give the oil and I usually instruct the head nurse and she sees to it that the nurses are instructed in this respect. At the present time our head nurse is personally taking care of the administration of the oil and she has been very much interested in a number of recent cases.

To Dr. Oastler I would like to say that our system is not a hard and fast system. It is not a very hard system to follow out. It is not applied indiscriminately to all of our patients. We do not mean to say that it is carried out with all of our patients. On the contrary, there are patients on whom we cannot apply all these things. It is a very flexible system.

The reason the sand-bags control the gas distention is because of the fact that the rectal tube is in the rectum and the rectal tube relieves the gas. I did not say that there is a necessity for the use of these bags simply because a tumor has been removed. I merely said that when a large tumor has been removed and these bags are placed on the abdomen they give compression and furnish a compensatory action. I simply made a sort of general statement. I do not think it is absolutely necessary because I remove a large tumor to have a lot of bags on the abdomen. It is true that some of our patients who have had these bags on their abdomen complain bitterly of their use. On the other hand, I desire to say that we have had patient after patient say to the nurse and the interne on the fourth day after the bags have been removed that they were sorry the bags had been removed.

DR. O. PAUL HUMPTSTONE read a paper on

THE END RESULTS OF CESAREAN SECTION.\*

DISCUSSION.

DR. A. B. DAVIS, in opening the discussion.—I am very pleased to hear this excellent report about Cesarean section. The results are better than almost any series that I know of of that size.

I believe thoroughly in Cesarean section in well-selected cases. I do not believe in it in every difficult case of labor by any means, but I do believe it is our best means of delivering a certain type or certain well-defined types of women.

I have lived long enough and had experience enough during the period before Cesarean section, to know that we sometimes got into difficulties and at times we still get into those difficulties and while there is a strain not only on the patient but also on the operator, the patient gets over the strain before the operator does, and the child never gets over it. So I believe that in Cesarean section the great majority of indications, as Dr. Humpstone said, are from disproportion. I found on looking over the records at the Sloane a percentage of 79 and at the Lying-In the percentage was 81, and of the remainder a large number of them were from cases where some form of suspension had been done. I think myself I have done ten such cases. In accidental hemorrhage it is one of our best means of treating that condition. Dr. Wing, working on my staff at the Lying-In Hospital, a year ago last September in about twelve hours had two of those cases. He saved both mothers and one child. Where the child was dead it was necessary to transfuse the mother twice.

I do not believe every case of eclampsia should be delivered by Cesarean section, but I believe there is a fairly definite proportion where that is the best way to handle those cases and the more I see of the postponing of delivery of women with eclampsia the less I believe in it.

As to the technic of the operation, I believe we would have fewer adhesions if we avoided two things: (1) The making of a low incision, and (2) the improper suturing of the uterine wound. I believe adhesions are avoided in my cases by reason of the fact that we close the uterus with two layers of sutures. The first layer is passed through the muscle about 1 c.c. apart, and the second closes the wound over the chromic sutures and consists of plain catgut.

I cannot discuss this whole paper as I think it would take a whole evening to do so fully, but the after-treatment or after-results of these cases is worthy of consideration. The greatest trouble, to my mind, especially in the class of cases that we have to deal with (people of the lower East Side and that type) is that in pregnancies subsequent to having a Cesarean section they disregard our instructions and allow themselves to go on in labor twelve, seventy-two or more hours and then they have a rupture of the uterus, whereas I believe if they would only have come back in time they could have

\* For original article see page 372.

been saved that rupture. I have lost one mother and several children in that way. In those cases where they had their Cesarean operation for obstruction I like to get them into the hospital and operate them before term.

**DR. S. MORRIS SLEMONS.**—Improved surgical technic has certainly broadened the field for Cesarean section and the only question at present is to determine how much more frequently the operation should be performed than formerly. Such papers as that of Dr. Humpstone will go far toward teaching us what the broader indications for the operation are. It is gratifying to hear the subject discussed so cordially here, when in a neighboring city it has given rise to bitterness between the obstetrician and the surgeon; the obstetrician contending that while the surgeon knew the operation and was capable of doing it, still he did not know the indications, the surgeon retorting that the obstetrician knew the indications for the operation, but was incapable of doing it and that the obstetricians did not know enough to use the light of day that God had given them.

I have not a large series of cases to report but just having gone over the work of my department in the Yale Medical School for the past year it is fresh in my mind. We performed eight Cesarean sections last year. One of them was indicated on account of pelvic dystocia. Another was performed for accidental hemorrhage. This was a case in which the myometrium presented many minute hemorrhages, more particularly in the neighborhood of the peritoneum. In those cases, as you know, the uterus does not retract well and hysterectomy becomes necessary to prevent fatal hemorrhage. In the other six cases the section was performed because of eclampsia. We still feel that immediate delivery in eclampsia is warranted but our results when the Cesarean was employed have not been as satisfactory as we hoped for. Of the six cases where section was done for eclampsia we lost two, one dying in twenty-four hours of toxemia. The other lived six weeks and died of pulmonary gangrene. My feeling, therefore, is that there is a type of patient with eclampsia in which a Cesarean is justified. In a primiparous woman near term with undilated cervix I should not hesitate to recommend a Cesarean, but in multiparous women I am inclined to think that equally good results will be obtained if a bag is introduced, medicinal measures resorted to, and as soon as possible delivery affected through the birth canal. Probably a great many papers on Cesarean section will appear in the near future and I am confident we shall learn that the field is much broader than we have thought. We will also learn more definitely the indications as to when Cesarean section should be done and when it should not be done in cases other than those where there is a frank pelvic indication.

## TRANSACTIONS OF THE BROOKLYN GYNECOLOGICAL SOCIETY.

*Meeting of Nov. 3, 1916.*

*The President, DR. WILLIAM P. POOL, in the Chair.*

DR. LEO S. SCHWARTZ presented a

### CASE OF SUBMUCOUS FIBROID OF THE UTERUS WITH SPECIMEN.

Mrs. A. F., forty-three years old, married twenty-one years, seven children, no abortions. Menses twenty-eight-day type, slight pain during flow, three days' duration.

About seven months before admission to the Jewish Hospital, patient had a period of amenorrhea for six weeks, after which she bled for about two weeks. She at this time thought that she had conceived and aborted. Four weeks later she commenced to flow again and continued for twelve days, bleeding very profusely. Her second period after her supposed abortion occurred on time, but the bleeding was very profuse and was accompanied by bearing-down pains in the lower abdomen. She now consulted a physician who diagnosed the case as an incomplete abortion and advised hospital treatment.

The patient was admitted to the Jewish Hospital, October 23, 1915. On admission patient had a large freely movable uterus. About one week after admission patient was curetted, but the contents of the uterus did not show any evidences of pregnancy. Patient was discharged with a large retroverted uterus.

Since leaving the hospital the patient bled profusely for about two weeks out of each month; bleeding was accompanied by bearing-down pains in the lower abdomen. She was readmitted to the Jewish Hospital on January 26, 1916. At this time examination revealed: bilateral laceration of the pelvic floor; tarry vaginal discharge; lacerated cervix; freely movable uterus the size of a two months' pregnancy. The diagnosis of a submucous fibroid of the uterus was made. On January 27, 1916, I operated upon this patient and removed her uterus and adnexa. On section the uterus showed pedunculated submucous fibroid the size of an adult thumb, arising from the left uterine wall and occupying the entire uterine cavity.

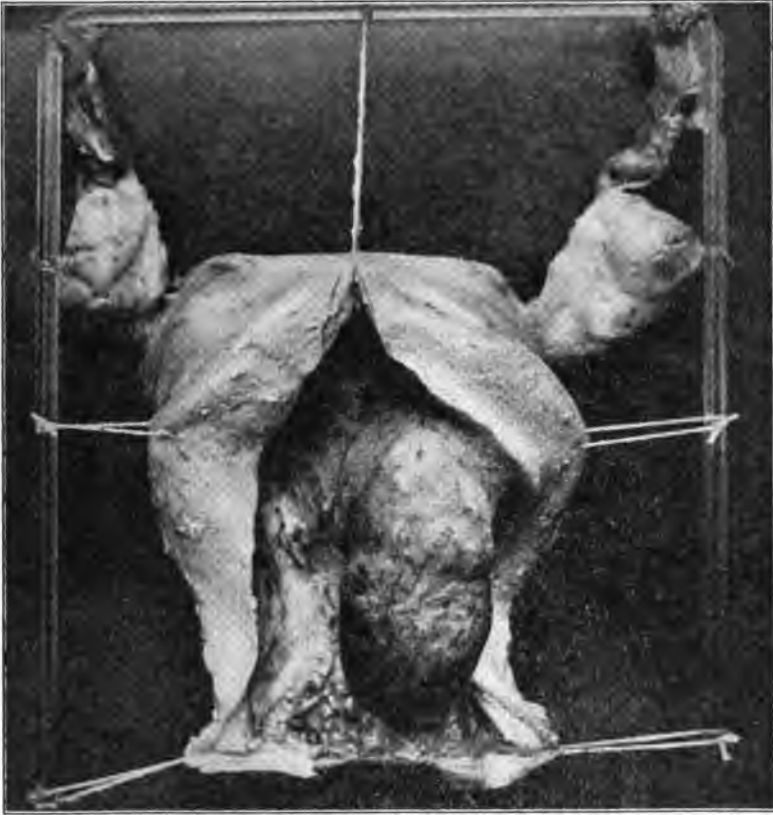
### DISCUSSION.

DR. HUSSEY.—I would like to ask if it is not the custom to incise the cervix and insert the finger in this type of cases? If this had been done undoubtedly the case would have been diagnosed at the time of the first operation.



DR. SHOOP.—Might not the fibroid have been removed and the uterus retained?

DR. POLAK.—One thing impresses me and that is that this case exemplifies the possibility of cureting the uterus and yet not being able to make a diagnosis. There is only one way to make an intrauterine diagnosis and that is to make an incision and depend upon a digital exploration. We have all learned that in incomplete



Schwartz—Submucous fibroid.

abortion, where there is a uterine content, there are apt to be bacteria present which makes the handling of the case a dangerous proposition. Curettage breaks through the protection wall; digital removal is less dangerous and vastly more intelligent. In the case history presented by Dr. Schwartz there is the suggestion of submucous fibroid all over it if we read between the lines.

DR. BALDWIN.—Three or four years ago I saw a woman upon whom a criminal abortion had been performed and later the physician attending her curetted the uterus. I found her still pregnant.

DR. SCHWARTZ.—Regarding the diagnosis, the first time this patient was in the hospital she was examined by Drs. Polak, Beach and Humpstone and submucous fibroid was considered. Not feeling it with the curet this diagnosis was given up.

DR. L. GRANT BALDWIN reported two cases of

#### DOUBLE NEPHROLITHIASIS.

I wish to report these cases simply to emphasize the fact that only a small amount of kidney tissue is necessary to maintain life. Many kidneys are taken out, the same as with the ovaries, which are active and which might have been of some use to the patient. The first case, Miss M., came under my care in July, 1910. At that time the x-ray showed that both kidneys were the seat of numerous and large calculi. Catheterization of the ureters showed that the left kidney was doing the work of both. The right kidney was removed and I showed it at a meeting of this Society. It was large and with the stones in it felt like a bag of marbles. In January, 1911, this patient married but fortunately has never become pregnant. She has had occasional attacks of hydronephrosis, when the kidney would fill up, but hot packs, morphia, atropine, sandalwood, and urotropin have given relief. The most severe attack since 1910 was in August, 1915, when she was in the hospital for fourteen days. I have submitted the case to a number of my professional friends and there has been a divided opinion as to the proper procedure. During the attack last August I thought her time had come, but putting her to bed, sweating and the stimulation of the other excretory systems relieved her and at present she is going about as usual.

The second case, Mrs. D., came to me in February, 1910. The x-ray showed stones in both kidneys, the right being enormously distended by a hydronephrosis. The right kidney was removed during the same month. It contained 1 pint of urine mixed with pus and forty-nine stones, the largest being about the size of a hazelnut. She made a good recovery. In May, 1913, she presented herself with an empyema of the gall-bladder. With one kidney out and the other containing calculi the question of such a serious operation was difficult to solve. However, she consented to the operation and went through it beautifully. She is well to-day and goes the round of social functions.

DR. A. M. JUDD reported

#### TWO CASES OF DEGENERATED MYOMATA.

"I wish to present two specimens which are of special interest. In one of the cases I took a week to make a diagnosis as to whether it was a pregnancy or not, and you will notice from the softness of the tumor why it was difficult. Unfortunately, the specimen does not show up well. The case report is as follows:

R. F., Russian, forty-three years of age, married twenty-six years. She had seven full-term labors, two miscarriages, none instrumental. The youngest child nine years ago, and the last miscarriage eight

years ago. The menstrual history was regular, normal, and the last menstrual period was seven weeks previous to admission to the hospital. For four weeks the patient had had pain in the lower abdomen and sacrum; no vaginal bleeding; pain resembled labor pain. One day before admission she had severe pain in the back and lower abdomen, severe chill, some rise of temperature, and frequent and urgent urination. There was no history of any intrauterine or vaginal manipulation which might make one believe that she considered herself pregnant and tried to bring on an abortion. On admission to the hospital patient had a temperature of  $101.8^{\circ}$ , pulse 100, with a leukocyte count of 15,000 and polynuclear 85 and 15. On examination abdominally there was a smooth round hard mass in the lower abdomen in the hypogastric region which was the size of a four months' pregnancy; some moisture in the nipples; no fetal heart. This mass as examined from the vagina went up smoothly in front of the cervix and posteriorly bulged into the hollow of the sacrum. I felt that it was an early pregnancy complicating fibroid and later when the temperature dropped I removed the uterus. The pathologist's report states that the tumor is a degenerating myoma; no evidence of pregnancy. The uterus shows a marked interstitial endometritis.

The second case is rather more interesting from the pathologist's standpoint. The patient was thirty-nine years of age, married. Her chief complaint was bleeding from the vagina. For the past year she had been having gastric symptoms. Her menstruation began at thirteen, and was regular; changed for a short time after marriage when it came on a few days earlier. The last regular period was October 1. She was admitted to the hospital on the 29th of October. The history shows that she has been married two years and in that time has had three miscarriages, the first was a three months' gestation, the last six weeks. The present illness: last period, October 1 and began bleeding October 22, no clots and no pain. There was a hard mass in the hypogastric region, harder than in the previous case, with a branch sticking out from the right side. The enlargement was just as much anteriorly as posteriorly. I thought it was about a four months' pregnancy. She had a temperature of  $100^{\circ}$  on admission. I did a hysterectomy after the temperature had dropped to normal. When I opened the abdomen if I had not seen the small mass on the right side I would have considered that I had a pregnancy and would have closed the abdomen. I am very glad I did remove the growth as it is a rare condition. It is a degenerated fibroid of the hydatid type and seems to have been in the wall of the uterus. The report of the pathologist is as follows: The histological picture admits of two interpretations: viz., first, that the tumor is a fibroid undergoing myxomatous or hydatid degeneration, a rather rare condition, or a hydatid mole undergoing fibroid changes. Sections of various portions of endometrium show no evidence of pregnancy, a simple hypertrophic endometritis.

The specimen in its gross appearance resembles a soft partly myxomatous tumor mass, arising from the musculature of the uterus

by a pedicle. In no part is it connected with the endometrium. Histologically, sections show, prominently, fibrous tissue, arranged in alveolar form, the alveoli filled with myxomatous tissue; in that sense is the growth interpreted as an hydatiform degeneration of a fibroid tumor.

DR. A. C. BECK showed a specimen and reported a case of

#### FIBROMYOMA COMPLICATING PREGNANCY AND LABOR.

A thirty-year-old primiparous negress, four and one-half months pregnant, was first seen April, 1916. On that date the fetal heart could be heard, and the fundus of the uterus extended 21 cm. above the symphysis. Several masses were felt by abdominal and vaginal examination, attached to the uterus. One, the size of an orange, was palpated in the upper left quadrant. Another was felt in the mid-line; a third, as large as a fetal head, was situated in the lower left quadrant. A similar mass of almost equal size was found in the anterior wall of the lower uterine segment, causing considerable posterior displacement of the cervix, and almost completely obstructing the pelvic inlet. As the patient was desirous of having a child, it was decided to let her go to term. She returned to the clinic frequently, but no untoward symptoms developed until Aug. 5, when she had a hemorrhage of about 500 c.c. On Aug. 14, the patient entered the hospital in labor. Examination showed the uterus to extend 27.5 cm. above the symphysis. The fetus was in left sacro-anterior and in good condition. The large fibroid in the lower segment which had previously almost filled the pelvic inlet, had arisen out of the pelvis and was felt above the brim. Had the presentation been a vertex, spontaneous delivery would have been possible. A version was considered, but, in addition to the difficulty which would have accompanied this procedure, it was feared that the lower tumor might interfere with the descent of the after-coming head. A Cesarean section was performed, after which the uterus was removed. The child was 48 cm. in length and weighed 2650 grams. The mother and child left the hospital in good condition. The specimen has contracted to about two-thirds of its size at the time of operation. The large tumor which obstructed the brim during pregnancy, and finally was drawn out of the pelvis during labor, is seen on the anterior surface.

#### DISCUSSION.

DR. J. O. POLAK.—The point of interest in this case is that the uterus may have the power to pull an incarcerated fibroid out of the pelvis during labor. I saw this woman when she came into the hospital, and it seemed impossible that the pelvic tumor could take care of itself. We feel that in fibroids complicating pregnancy, the case should be watched during pregnancy, and if no changes take place in the tumor, the patient should be allowed to go into labor, when the line of procedure becomes clear. We have seen such incarcerated tumors drawn up out of the way. The main difficulty is the delivery

of the placenta, because of the tortuous canal, and the interference is likely to give rise to an infective process so ably described by my colleague, Dr. Humpstone.

DR. J. O. POLAK reported a case, with specimen, of

#### MYOMA COMPLICATING PREGNANCY.

The specimen I wish to show is one that remained quiescent until pregnancy occurred. The patient was a woman about thirty years of age, who had been in perfect health, except for an attack of sciatica just after marriage, and this is the only history she gives referable to the pelvis. During the night of May 30, while traveling she was taken with intense pain, vomiting and obstipation. She was told by a physician that she was probably pregnant, but that her calculation of her time was wrong. After a few days, the pain quieted down and she returned to Brooklyn. In the early part of June, she was seized with another attack of abdominal pain, with some rise of temperature, and great tenderness over the abdomen at the site of the tumor. I saw her in consultation. She had temperature, the mass was sensitive, and I was told that the tumor had increased considerably during the week previously. There was a leukocytosis present with an increased polynuclear count. She was brought into the hospital with a diagnosis of a pregnancy complicated with a degenerating fibroid tumor. After the subsidence of the temperature and an improvement in the blood count, I opened the abdomen and removed the tumor with the uterus. You can readily see that the pregnancy was in a sacculum of the uterus, adherent and incarcerated in the culdesac of Douglas, with the tumor above it. I did as Deaver suggests, I incised the uterus to be sure I was not dealing only with a pregnancy. The tumor had softened in the center, and simulated a pregnancy, and I could not be sure until I incised it. It was a retroflexed, incarcerated and adherent uterus, with a fibroid on the anterior face. The woman made an uneventful recovery. It was too bad to remove the uterus in a woman of thirty, but it seemed necessary.

#### DISCUSSION.

DR. JUDD.—Some years ago, I reported to this Society a case in which I did not suspect pregnancy, and did a myomectomy. I found an early pregnancy, which was, of course, destroyed by the operative procedure, as in doing the myomectomy, the cavity of the uterus was opened. The woman has had two children since.

DR. HOLDEN.—In what part of the uterus was the tumor situated?

DR. JUDD.—I entered the cavity of the uterus in the myomectomy, but did not expect to do so. I did a Cesarean section on a small fetus and closed up the uterus.

DR. BECK.—Would Dr. Judd do such an operation in a case of a degenerating fibroid?

DR. JUDD.—I think it would be worth while.

DR. POLAK.—I think if you will consider the history of this case,

with the leukocytosis, and the clinical picture of the growth, and the fact that the tumor was sectioned and we demonstrated a classical red degeneration, which we are told is necrosis, that one would be almost afraid in such a case to do a myomectomy. In the specimen we can see the spongy layer between the placenta and the capsule of the tumor.

DR. WALTER B. CHASE reported a case of

#### MENORRHAGIA TREATED BY RADIUM.

Mrs. W., aged forty-eight, had had a menorrhagia of three years' standing, no sign of menopause. The uterus was about the size of a two and one-half months' pregnancy, and the condition was diagnosed as a diffuse symmetrical fibrosis. The patient was anemic, nervous, exhausted, an invalid from long-continued bleeding. It was not a favorable case for operation. March 25, 1916, 800 milligram-hours of radium was applied within the uterine cavity. At this date, November 3, 1916, Dr. Polak reports that the uterus has diminished over 50 per cent. in size and that the patient is in good health.

#### DISCUSSION.

DR. POLAK.—Dr. Chase's case presents some interesting points. The doctor gave her 50 milligrams of radium for sixteen hours; the radium capsule was placed inside the uterus after the cervix was dilated under morphine; the cervix and vagina were then packed. There was a bloody discharge for two or three weeks characteristic of a burn necrosis. When the doctor first treated the patient, she had a hemoglobin percentage of between 30 and 40, and was a poor operative risk. I saw her day before yesterday, when her hemoglobin was 80, and she had not flowed any since last March. She has the usual senile uterus, hard, with the typical atrophy found in women of her age, and which has been described so impressively in the work of Jeff. Miller, of New Orleans. The uterus is movable, of the general fibrotic type, where there has been a substitution of yellow elastic tissue for the muscle fibers.

DR. WILLIAM A. JEWETT read a paper entitled

#### PELVIC VARICOCELE.

After an outline of the literature the following case was reported: Mrs. M., twenty-six years of age, born in Russia, was admitted to the hospital on May 11, 1916, her chief complaint being dysuria and pain in the right lower quadrant of the abdomen. Her family and previous personal histories were negative. She had been married six years and had had three children, the first four years ago and the last four months ago. Her deliveries were normal as were her puerperal periods. She began to menstruate at the age of fourteen, always regular, with a three-day habit. Her last period was three months ago. About three years ago she had an attack of severe burning pain just after urinating, which lasted for several weeks and

then subsided. Shortly after this she began to complain of a pain in the right lower abdomen, which came at irregular intervals, being especially severe when doing housework. The pain at times would be of a sharp sticking character; at other times would be dull and aching. Since the birth of her last child the pain has been with her continuously, and there has been also a return of the painful urination, such as she had three years ago. Her bowels are constipated, sometimes going a week without a movement. Physical examination showed a fairly well nourished woman with rather poor muscular development. Heart and lungs normal. Abdomen scaphoid, with no increased tension or masses present. She was tender over the McBurney and right Morris' points. Right kidney easily palpable but not tender. Pelvic examination showed a fair pelvic floor with a good muscle sling; cervix had a very slight bilateral laceration. Uterus in good position, insensitive, and freely movable. Adnexa easily felt, apparently normal, though somewhat tender, especially on the right. The urinalysis revealed a trace of albumin and some pus cells. She was given bladder irrigation twice daily with silver nitrate solution 1 to 4000, together with urotropin internally and in about two weeks' time her bladder symptoms were entirely relieved, though she still complained of the dull pain in the right side. A cystoscopic examination at this time showed the bladder mucosa in fair condition with some evidence of a trigonitis. The ureters were catheterized, the catheter on the left side passed easily to the pelvis of the kidney; on the right side an obstruction was met when the catheter had been introduced 12 cm. Right and left urines were negative for pus.  $\alpha$ -ray examination proved negative for stone. There was still present a definite tenderness over Morris' point on the right side, approximately over the area where the ureter crosses the pelvic brim, and where the catheter was obstructed. On opening the abdomen, the uterus was found normally placed, with perhaps a slight descensus, adnexa on both sides normal and free from adhesions. The veins in the left broad ligament were normal, while those on the right side were markedly varicosed from the side of the uterus to a point about 2 inches above the pelvic brim. The appendix was normal and there were no adhesions in the neighborhood of the cecum. Palpation along the line of the ureter did not disclose any induration at any point; in fact, the only abnormal condition found was in the right ovarian veins. The portion of veins lying in the broad ligament was ligated and excised and the wound peritonealized. A prophylactic appendectomy and an Olshausen suspension completed the operation. Entire relief from her symptoms followed the operation, and when the ureters were again catheterized, a few days before leaving the hospital, no difficulty was experienced in reaching the kidneys on both sides. At the time of this final examination, the ureters were injected with a solution of thorium nitrate and an  $\alpha$ -ray taken. This disclosed an interesting condition. The left side was normal; there was present, on the right, a moderate dilatation of the kidney pelvis and upper portion of the ureter, and a decided kink in the ureter was

observed at a point nearly opposite the lower pole of the kidney. Just what relationship there was, if any, between the dilated veins and the kinked ureter could not be definitely determined. The most tenable theory, it seems to me is that there was an anomalous arrangement of the vessels in the neighborhood of the kidney, which, together with the downward displacement of the latter organ, obstructed both the flow of urine from the kidney and the return flow of blood in the vein. The obstruction met with in the first catheterization may have been caused by the pressure of the varicose veins where they crossed the ureter above the brim of the pelvis.

The patient was advised of the condition present and told that another operation might be necessary, if the relief which she had received was not permanent. She was fitted with a surgical corset and for a time was quite comfortable. A few days ago, on communicating with her physician, I learned that she had had two or three attacks, recently, of sharp pain in the region of the right kidney that lasted for a day or two at a time, though not as severe as before the operation. She has been practically free from pain in the pelvis.

#### DISCUSSION.

DR. CHASE.—I have had no experience in these cases, but I desire to compliment the reader of the paper. I want to state that in making examinations for displacement I never reach a conclusion without examining the patient in a standing position. It often discloses a displacement not otherwise made out or suspected.

DR. POLAK.—I should like to ask Dr. Jewett if he ties the veins first and then after splitting the ligament, cuts the vein through. Our technic has been to take up the adnexa and split the peritoneum distal to the tube and then with blunt dissection expose the veins, tying them in their entirety without cutting them. I think that the technic was brought out by Pinkham. The symptomatology brought out by the doctor seems to be a strong point. The physical signs in these cases are not definite; we may get an absolutely normal pelvis and yet there are two things, tenesmus on standing, and premenstrual pain in the affected side. My experience has shown that ligature of the veins has relieved the symptoms.

DR. ALBERT M. JUDD read a paper entitled

#### FREQUENT URINATION IN WOMEN.

Frequent urination with or without pain is such a frequent symptom among women presenting themselves to the medical man, and treatment is so often attempted without due recourse to finer methods of diagnosis as to causative factor or factors that the author feels that again calling attention to the subject will be of value. The majority of cases when first seen by the general practitioner are dismissed with either a prescription for some alkaline mixture or for urotropine or some of its allies with the result that they seek relief from one man after another and so perhaps finally come into the hands of one who specializes along these lines, much injured in mind



and body from such a prolongation of symptoms and the lesion or lesions causing them. The general practitioner has neither the time, instruments or amount of clinical material if he does possess them, to perfect himself in their use.

The author makes a plea that such cases be sent earlier to the specialist. The general man would not treat the eye without having the eye grounds viewed. The following conditions may cause the above symptom. Frequency of urination with or without pain is present in women in the following conditions. Urethral caruncle. Urethritis acute and chronic, gonorrheal and other infections. All cases of urethritis are not gonorrheal, the causative agent influences the method of treatment. Urethritis is another condition which may easily go unrecognized, it is just as important to make an endoscopic examination of the female urethra as the male urethra. Inflammatory conditions of the urethra even when a cystoscopic examination is made, are sometimes overlooked, unless the urethra is inspected on withdrawing the cystoscope or a separate endoscopic examination is done. Inflammation of Skene's glands. The examination of Skene's glands is of extreme importance as they are often the site of gonorrheal infection and it may be the only site in the vaginal tract where the gonococcus is lying dormant. The same remarks apply as in urethritis. Urethrocele. Relaxation of vesical sphincter. Cystitis. Ulcers, not tubercular, of the trigens or other portions of the bladder. Tuberculosis of the bladder. Benign tumors of the bladder, malignant tumors of the bladder. Stone in the bladder. Cystitis or pyelitis of pregnancy. Pressure of tumors on the urethra, neck of the bladder, on the bladder itself or on one or both ureters. Uterine displacements. Pelvic inflammatory conditions. Stone in lower ureter. Ureteritis. Periureteritis. (Those who wish to make the diagnosis of these two conditions must learn to palpate the ureters, as outlined in a previous paper by the author.) Kinking or narrowing of the urethral canal accompanying cystocele, which has been so well shown in a recent article by Peterkin of Seattle, Washington. Movable kidney causing the same narrowing by dragging on the ureter; this was brought out in an article by Newman of Glasgow in 1913. Tuberculosis of the kidney or ureter. Stone in kidney. Malignant tumors of kidney. Pyonephrosis. Hydronephrosis. Hematogenous infection of kidney. Oxaluria. Bacteruria (colon bacillus, etc.) Extremely acid urine. Chronic interstitial nephritis, bilateral or unilateral. Diabetis mellitus or insipidus. Menstrual irritability, probably a passing congestion of the trigone. A condition which causes frequent urination without pathological changes may well be called hysterical frequency; in this condition the constant desire to void is brought about by acquiring the "habit of voiding" and the bladder wall loses muscular tone because there is never enough urine allowed to remain to fill the bladder completely. The treatment of this condition is a systematic scheme of voiding, and with a gradual lengthening of the intervals between the times of urination. An analysis of the above causative factors of this annoying symptom

will give one a new feeling of respect when approaching such a case and impress you with the fact that a complete analysis takes both time and knowledge of diagnostic technic. Having discovered the cause the treatment is simplified, but still presents special technical difficulties requiring special instruments and training.

#### DISCUSSION.

DR. VICTOR A. ROBERTSON.—The causes of this symptom are undoubtedly innumerable, both intrinsically and external to the bladder. Almost any pelvic condition will cause it. Dr. Judd speaks of abnormal urine. In indicanuria, which is often accompanied with a high degree of acidity, this symptom may occur, and we must clean out the intestinal canal before improvement will follow. In testing for acidity we ought to get beyond the mere use of litmus paper, we should triturate it with normal sodium hydrate solution to discover the degree of acidity. The condition known as acidosis is often accompanied with dysuria. In addition there is a class of patients which may be described as gynecological neurasthenics. I have met them and I have come to the conclusion that there is a physical cause for the symptom if we can only find it, but frequently it is beyond the diagnostic acumen of many of us, nevertheless there are cases in which there appears to be no possible physical cause, and yet frequent and painful urination is present. We are taught that nervous, hysterical women will retain their urine for long periods; we have all seen such cases. The opposite condition of frequent urination is also frequently seen in neurotic women. I am glad the doctor spoke of the ureters, with their accompanying morbid conditions. I have never been able to palpate them. As to interstitial nephritis in one kidney: I cannot conceive of such a pathological condition as interstitial nephritis attacking only one organ.

DR. GIBSON.—Dr. Judd has left out one cause of frequent urination. About four years ago there appeared a paper on "chronic congestive trigonitis" illustrated with pathological specimens and photographs. The author claimed that it was a deep-seated, round-celled infiltration. He tried to operate through the cystoscope but explained that many cases did not show up well through the cystoscope.

DR. CHASE.—I had a case of frequent urination some years ago in the treatment of which I went through all the niceties of attention without result until I found that the condition was due to ulceration of the rectum, the relief of which cured the patient. This condition should not be excluded in considering such cases.

## TRANSACTION OF THE NEW YORK ACADEMY OF MEDICINE.

### SECTION ON OBSTETRICS AND GYNECOLOGY.

*Meeting of November 28, 1916.*

*The Chairman, DR. GEO. W. KOSMAK, presided.*

*(Program contributed by the Obstetrical and Gynecological  
Staff of the Long Island College Hospital.)*

DR. HARVEY B. MATTHEWS, reported a case of

#### POSTERIOR COLPORRHEXIS WITH ESCAPE OF THE FETUS INTO THE PERITONEAL CAVITY.

Mrs. M. McC., born in Ireland, thirty-four years old, para-xv, was brought into the Methodist-Episcopal Hospital by ambulance at 5.30 A. M., June 19, 1914. Family and past history irrelevant. Menstruation began at fourteen, always regular, every twenty-eight days; no pain; normal flow; number of days not given. Last period October 1, 1913. Calculated date of confinement July 8, 1914. She had fourteen children, all full-term babies, all easy labors, five children alive and well at the present time; nine children dead, causes not given. Age of oldest and youngest child not recorded on the history. No miscarriages. Labor pains began very abruptly on June 19, 1914, at 1.30 A. M., which was about three weeks before the calculated date of confinement. The pains were very severe for a half to three-quarters of an hour. Suddenly, after a severe pain, the patient noticed that she had no more pain. A few minutes later she noticed considerable bleeding and, almost immediately, the placenta was expelled. The family physician was hurriedly summoned and he ligated the cord and removed the placenta. What happened during the next three hours was not recorded. However, the Methodist-Episcopal Hospital ambulance was called at 5.30 A. M. and removed the patient to the hospital.

*Examination after admission.*—General condition of the patient poor; considerably shocked; pulse rapid, 140, irregular, small and poor quality. Blood pressure not taken. Abdomen extremely large and markedly pendulous with an umbilical hernia protruding, which measured 20 by 15 by 10 cm. Child in transverse position with the head to the right, the feet to the left and the back to the front and below the umbilicus. Above the umbilicus the soft parts

were easily felt. The child was apparently just beneath the abdominal wall and could be moved about easily. The fetal heart was not heard. The pelvic measurements were not taken. Vaginal examination revealed a large amount of clotted blood, considerable fresh bleeding and a protruding umbilical cord. The cervix was not made out. The removal of more clots of blood revealed a large tear in the posterior wall of the vagina.

A diagnosis of rupture of the uterus was made and abdominal section decided upon.

*Operation.*—Dr. F. C. Holden, operating. Ether anesthesia; drop method with open cone used. Median longitudinal incision below the umbilicus. Upon opening the peritoneal cavity a full-term fetus was found free in the peritoneal cavity, lying transversely in front of the uterus. There was also an immense amount of free blood and clots present. The child, which was, of course, dead, was extracted. The blood clots were removed and upon further inspection the uterus was found not to be ruptured, but, instead, the large tear in the posterior wall of the vagina, discovered by vaginal examination before operation, opened into the culdesac of Douglas, and through this opening the child had escaped back into the abdominal cavity. A supravaginal hysterectomy with clamps was quickly done. Ligatures were quickly placed and the clamps removed. Iodoform gauze was placed over the cervical stump and carried down through the tear in the posterior vaginal wall out into the vagina. Several sutures were placed on either side of the gauze to further close up the tear and thus prevent prolapse of the intestines into the vagina. Length of operation, twenty minutes. Normal saline 3xx, adrenalin 1-1000 Mxx were given by infusion during the latter part of the operation. The patient was in marked shock; pulse 138, very irregular and poor quality. Her condition constantly grew worse and she died twenty hours after the operation. The baby weighed 9 pounds and measured 53 cm. in length. The head measurements were as follows: O. M., 13.5, O. F., 12.5, S. O. B., 11.5, Bi-P., 10.

*Comments.*—Judging from the small number of cases reported during the last hundred years, rupture of the posterior wall of the vagina with escape of the fetus back into the peritoneal cavity is a very rare accident. Berry Hart, in 1883, read a paper before the Edinburgh Obstetrical Society, entitled, "A Contribution to the Anatomy and Etiology of Rupture of the Peritoneal Portion of the Vagina During Labor," in which he endeavored to show and explain how rupture of this portion of the vagina actually took place during labor. Among other things, he showed that "the posterior vaginal wall is structurally weak at its upper half-inch or more, is more elongated during labor than the anterior one, and, therefore, rupture of the vagina is most common where the posterior vaginal wall is covered by peritoneum, and when it occurs is a tension tear like cervical rupture."

Clinically, we have a combination of conditions which, when present, tend to favor the rupture of the posterior vaginal wall. These are:

1. *Multiparity*.—All cases reported have occurred in women who have had from nine to eighteen children.

2. *Markedly pendulous abdomen*, with or without a true umbilical hernia—is always present.

3. *Prolonged Labor*.—Which may or may not always be present, as in the case just reported.

All of the cases reported have presented these three conditions, except in this particular case, which gave a history of having been in labor only a half to three-quarters of an hour. However, this patient had an extremely pendulous abdomen with a fairly large umbilical hernia which permitted the fundus of the uterus to drop to a position that brought the axis of the uterus parallel to the axis of the superior strait, and with the consequent extreme stretching of the posterior vaginal wall rupture took place during the first few pains. It, therefore, will be readily seen that if the fetus remained in the proper axis of such a uterus, and it always does, a rupture of the posterior vaginal wall, which is sure to occur sooner or later if not properly treated, would easily permit the fetus to escape into the abdominal cavity, thus following the line of least resistance.

DR. GORDON GIBSON, M. D., reported

#### TWO CASES OF COMPLETE PROCIDENTIA WITH COMPLETE LACERATION OF THE PERINEUM.

We have long believed that complete procidentia and complete laceration of the perineum did not occur together and have so taught. None of the members of the staff had ever seen a case until these two cases were admitted within a few days of each other. The text-books on gynecology have nothing to say regarding this subject and whether cases have been reported in the literature or not we are unable to say.

The first patient, Mrs. I., was admitted to the service on March 20, 1916. She was fifty-four years of age having had two instrumental deliveries, the last twenty-two years ago, following which she had incontinence of feces. She passed the menopause eight years ago without trouble. Thirteen years ago her vagina inverted suddenly while she was doing some heavy work. She was able to replace it and wore a napkin to hold it up until four years ago when she was unable to replace it. At this time she noticed that her rectum protruded.

The physical examination showed a stout woman appearing about sixty years old. The lungs showed moderate emphysema, the heart moderate myocardial weakness with a slight systolic murmur and accentuation of the pulmonic second sound. There was moderate edema of the legs. The urine showed a few red cells, a trace of albumin and no casts. The renal function was 10 per cent. for the first hour and 20 per cent. for the second. The blood pressure was 88 mm. of Hg. systolic and 90 mm. diastolic. The blood was normal in every respect.

The uterus was found to be completely prolapsed and the rectal mucosa protruded 1 inch. On replacing the uterus and vagina

it was found that the rectovaginal septum was lacerated upward for 2 inches. She received daily tamponade and local treatment with cardiac and renal tonics until April 14 when it was decided that her condition had improved enough to warrant operation.

On the 15th at 8.30 she was given a quarter of a grain of morphia and an ampule and a half of scopolamine. Half this dose was repeated an hour later and at 10.30 she was asleep but could be roused easily. Gas and oxygen were then administered. The rectal and vaginal mucous membranes were dissected free, the rectum closed the ends of the sphincter isolated and united and the vagina closed over these sutures, the idea being to try to restore the sphincter at this sitting and later to deal with the procidentia. This operation failed absolutely.

She was again treated locally and on May 23 was again operated on under gas and oxygen with 1 ounce of ether.

At this time I did the Warren operation of dissecting a rectangular flap from the posterior and lateral walls of the vagina, allowing this to fall forward forming the anterior wall of the rectum and bringing the sphincter and levators together in front of the flap. The dissection was carried high on the lateral walls of the vagina and when the edges were brought together it left a canal that would admit one finger only with difficulty. The uterus was by this time very small and it was believed that it could not come down into the very narrow vagina. The perineum was reinforced with three deep sutures of silver wire. The operation lasted one hour and she stood it well. The silver sutures were removed on the fourteenth day. There was primary union and the sphincter ends were united. The flap left protruding from the rectum gradually sloughed off. The patient left the hospital on the 20th of June with full control of the sphincter and no return of the prolapse.

The second patient, Mrs. B., was admitted on April 11, 1916, to Dr. Pool's division of the service and I wish to thank Dr. Pool for the privilege of reporting this case with the above. The patient was fifty-three, had had eight spontaneous labors and normal puerpera with the exception of the last fourteen years ago when she was kept in bed for four months. There had been incontinence of feces for fourteen years and seven months before admission she first noticed prolapse which increased rapidly until four months before admission when it was complete.

The urine, blood, blood pressure and kidney function were normal. The physical examination was negative except for a complete procidentia and a laceration of the rectovaginal septum upward for  $1\frac{1}{2}$  inches. On the 18th of April Dr. Pool operated on her under gas and ether, doing the Warren operation to restore the sphincter with the idea of treating the procidentia later. This operation failed, the failure being attributed by Dr. Pool to his not going high enough on the lateral walls of the vagina in getting his flap and to not bringing the levators together at this time to support the sphincter.

She was treated locally and on May 11 Dr. Pool again operated on her doing at this time a vaginal hysterectomy after the method

of Goffe and a very high Warren operation. This was entirely successful and the patient was discharged on June 29 with full control and no return of the prolapse.

The first patient has left town for the country and could not be traced. Mrs. B., Dr. Pool's patient, is doing her work and has had no return of her condition.

#### DISCUSSION.

DR. HERMANN J. BOLDT.—I have never done an operation on a case of complete procidentia with complete laceration of the perineum, but it has interested me to hear Dr. Gibson say that he used morphine and scopolamine anesthesia in one of the cases that he has just reported. That form of anesthesia has proved an advantage in my experience where it has not been advisable to use ether and I think that in proper cases we should strongly urge this form of anesthesia. In fact I have done several major operations without using anything but scopolamine and morphine.

DR. WILLIAM P. POOL.—Our teaching that where we get a complete tear we do not get procidentia has not been right since we have had two cases with complete tears and complete procidentia.

DR. GORDON GIBSON.—At the same time that these two cases were in the Long Island College Hospital there was another case at St. Peter's Hospital. This was the only case of this kind ever admitted to St. Peter's Hospital and the cases that Dr. Gibson has reported are the only two, ever admitted to the Long Island College Hospital, so it would seem that this condition is very very rare.

DR. GEO. W. PHELAN discussed the

#### ETIOLOGY IN A CASE OF RECURRENT MISCARRIAGE.

On the morning of October 5, 1916, a young woman was admitted to the Obstetric ward of The Long Island College Hospital, with an ambulance diagnosis of threatened abortion.

There was found on examination a blood-colored vaginal discharge, rhythmical uterine contractions and the fundus was at the umbilicus. The position of the fetus was a vertex with no signs of fetal life.

The patient was prepared and fifteen minutes later miscarried. There was little or no bleeding and after waiting one and a quarter hours the placenta was Credèd.

The patient spoke practically no English and her history was obtained some days after the major part of the physical and laboratory findings had been established. The patient was an Italian girl of twenty-nine years of age, with practically a negative previous history. She began to menstruate at thirteen years of age, six to eight-day habit, suffered no pelvic pain. Has never been regular. Until two years ago, the periods occurred every four to five weeks. Since that date, however, has been even more irregular and at times suffered metrorrhagia. The day before menstruation is established she suffers with severe frontal headache, backache and vomits all

food. Once menstruation is established the molimen quickly passes away. Last period May, 1916. She is not addicted to drugs or alcohol. Her diet, for the past ten years, has consisted chiefly of milk and carbohydrates. Sleeps well. Her work is essentially light work. No history of gonorrhea. No history of syphilis save shortly after marriage had a well generalized rash. Married fourteen years. Has never had a full-term child. Has had twenty-one abortions and miscarriages, including this last. A few have been incomplete and consequently she has been curetted a few times. Patient had convulsions with one pregnancy and the doctor in attendance induced labor. Patient states that some of fetuses have been covered with a rash at birth.

*Physical Examination on Admission.*—Small framed, small muscled girl of twenty-nine years. Skin shows diminished hemic component, also shown in the nail beds, palpable conjunctivæ. Very slight cyanosis of the ears, lips and extremities. Pupils are equal although under the influence of atropin. Extra ocular movements good. No nystagmus, no palsies, no Von Graef, no Stellwag signs. Face asymmetrical, the right half from the malar prominence down is not as full as the left half. Corners of the mouth draw back equally. Teeth show slight pyorrhea. No scars on the buccal mucous membrane. Mucous membrane of the throat is engorged and the tonsils are slightly enlarged yet not ragged. No scars about the corners of the mouth, nose, hands or between the fingers. Nail beds show a normal form. On either side of the neck are ten glands, hard movable, not tender. The epitrochlears are not palpable. Thyroid not enlarged. Thorax narrow, shallow. Respirations are a little increased. Right upper is not as prominent as the left upper. Apex is percussed  $\frac{1}{2}$  inch above the clavicle. Resonance front, sides and back not impaired. Fremitus normal anteriorly and just palpable in both lower axillary regions. Posteriorly the fremitus is slightly increased at the right apex. Bronchovesicular breathing over the right apex, and expiration slightly prolonged. No rales brought out on cough. Heart and circulation: Vessel walls are easily palpable and show moderate sclerosis. Pulse is noncollapsible. The right heart is percussed 5 cm. to the right of midsternal line, base at the third rib. The left side percussed 12 cm. to the left of midsternal line. Apex impulse is localized strong and regular, rate 80. No shock or thrill. First sound at apex is loud and booming in character—systolic murmur. Second sound not reduplicated. No diastolic blow is audible. Aortic area—first sound is replaced by a loud blowing, diastolic murmur, second sound short and rough, followed by a loud diastolic murmur, heard loudest in aortic area, also definitely loud in the fourth interspace. Poor capillary pulse. No stubbing of the fingers. Over the carotid a marked systolic and a slight diastolic murmur is heard. Abdomen negative save involuting uterus. Reflexes normal.

*Blood examination* showed red cells 4,870,000, white cells 8490, hemoglobin 85 per cent. (Sahli), 80 per cent. polynuclears.

*Urine* showed a sp. gr. 1023, reaction acid. Albumin, heat and nitric acid, positive, with few granular casts.



The x-ray report showed a cardiac enlargement with slight increase in size of aortic arch. The ophthalmic report showed nerves good color and oval shaped. In right eye small white spot in macula region (choroidites). Refractory error—hypermetropia, astigmatism.

October 6, the maternal blood and blood from placenta showed a negative Wassermann.

October 9.—Owing to persistent headache a spinal puncture was done and 20 c.c. clear fluid withdrawn under increased pressure. White cells per cubic millimeter 4. Butyric acid negative, Fehlings negative, Wassermann 3 x.

October 23.—A provocative dose of salvarsan (6 gm.) was given.

October 24 and October 25.—Blood still gave negative Wassermann.

November 2.—Spinal puncture, 20 c.c. withdrawn under considerable pressure. Wassermann negative.

November 16.—Under light anesthesia patient curetted for diagnostic purposes, curetings showed decidual cells and remains of villi.

Case report would hardly be complete without some mention of pelvic examination and the placenta and fetus.

Fetus a female 28 cm. long, well formed and presenting absolutely nothing abnormal from inspection. An autopsy was refused.

The placenta was of normal size and shape and showed slight infarcted areas. The relation of fetal weight to placental weight was one to five x.

Examination of patient showed no scars on introitus. The perineum was practically intact though somewhat relaxed. Pelvic floor good. Cervix long and in the axis of the vagina. Deep right laceration. Fundus anteverted and flexed, mobile and not tender. Adnexa healthy and save for slight thickening at base of right broad ligament the parametrium was negative.

It is of interest to note that following first lumbar puncture patient has been practically free of headache, a condition, what, I later ascertained, had existed for the last two years more or less constantly. Before the last spinal puncture was done patient had been on heavy doses of K. I.

The diagnosis was as follows: Syphilis with possibly early cerebral involvement, arteriosclerosis, aortic insufficiency, relative mitral insufficiency, and chronic interstitial nephritis (arterial).

DR. WM. P. POOL presented a report on

#### CONSERVATIVE TREATMENT OF THE UTERUS IN A CASE OF SUBMUCOUS FIBROID.

The patient was twenty-five years old and had been married three years. Although desirous of children she had been sterile to this time. Her earlier menstrual history was normal, menstruation having been regular and painless, of the twenty-eight-day type and three-to four-day habit. About a year and a half after her marriage she first noticed a change in the menstruation, the flow becoming a little more profuse and the period lasting a little longer. At the

same time there appeared a slight comenstrual pain. From that time the symptoms gradually increased, the flow lasting seven to ten days and becoming extremely painful. The intervals shortened and the flow lengthened till there was a constant discharge of blood and constant pain. This last condition had continued for three months when I first saw her, in July, 1913.

There was no history of pregnancy, and no history or evidence of infection. Her general condition was serious as a result of the prolonged hemorrhage. Hemoglobin 46 per cent., blood pressure 100, pulse varied from 120 to 140.

Pelvic examination showed no lesion in the lower genital tract. The cervix was normal in appearance and consistence, while a small but continuous stream of blood poured from the external os. The body of the uterus was anteverted, somewhat enlarged, and hard to the touch, and tender upon pressure. A diagnosis of submucous fibroid was made.

After a few days' rest, during which time there was no cessation in the bleeding or improvement in her condition, it was thought unwise to defer operation.

The cervix was first dilated and the uterine cavity explored with a curet. A firm and irregular protrusion was discovered at the fundus, which supported the diagnosis.

The abdomen was then opened and upper part of the uterus was found to be symmetrically enlarged, firm, and smooth. There was no evidence of a growth upon or near its external surface. As the patient was much opposed to the sacrifice of the uterus, it was first explored by an incision through the anterior face of the fundus in the median line, and there was found in the cavity a submucous fibroid about the size of an English walnut planted squarely at the fundus. The tumor had a broad attachment to the uterine wall. The incision was enlarged sufficiently to permit the enucleation of this mass, which was accomplished without difficulty. The cavity and walls were examined for other growths, and none were found. The uterine wound was then carefully closed, the surfaces being accurately coapted by deep and superficial sutures, and the line of incision peritonealized with a running suture of fine gut. The patient made a good recovery and rapidly improved in general condition. She was under observation for about two months after operation, during which time menstruation recurred normally and painlessly. The period lasted four days, and was not unusually profuse. I then lost sight of her as she removed to a distant city. Recently she wrote me that she has just passed through an uneventful pregnancy and been normally delivered.

This operation has been applied to two other similar cases within the past fifteen months. Both were young, nulliparous women, and in each case the result has been the restoration of the normal menstrual function, though to the best of my knowledge there has been no pregnancy in either case to the present time.

Such treatment would, of course, not be advisable in all cases of submucous fibroid. Two conditions must be present to indicate the

operation: 1. Assurance that there is no infection, or degeneration of the tumor. 2. The tumor must be single. Reasonable certainty concerning these conditions may be obtained before and at the time of operation.

Comparison of this method with vaginal hysterotomy inclines us to favor the former, in cases such as the one related. The vaginal route in a nulliparous woman is attended with considerable difficulty, and may entail a traumatism and postoperative morbidity more extensive than that of the intraperitoneal method.

DR. LEO S. SCHWARTZ presented a specimen and report of a case of

#### PRIMARY SARCOMA OF OVARY.

This patient twenty-one years of age, single, was admitted to the service of Dr. John O. Polak at the Jewish Hospital, June 21, 1916. Family history negative. Menstruation began at twelve, regular, every twenty-eight days, no dysmenorrhea, moderate flow, three days' duration. Last regular period occurred on June 1, 1916.

Patient enjoyed good health until about four months ago when she began to complain of sharp sticking pains in the right side of the lower part of her abdomen. Such attacks of pain occurred very frequently, at times coming on once or twice a day. This continued for about two months and then stopped. She now first noticed a swelling in the lower part of her abdomen. This swelling rapidly increased in size and two weeks before her admission to the Hospital, she again began to suffer from pains now referred to the entire lower part of her abdomen. These attacks were so severe that patient was obliged to take to bed. Although she felt weak, her appetite was good and she lost no weight.

Examination on admission; a fairly well-nourished female; lungs negative; no cardiac enlargement, but there was a soft blowing systolic murmur at the apex which was transmitted to the left axilla. Both sounds at the bases normal. Abdomen presented a hard, nodular, freely movable, slightly tender mass arising from the pelvis, occupying the entire right iliac fossa, and extending upward to about 3 cm. above umbilicus. Rectoabdominal examination revealed a small freely movable uterus pushed to the right and upward by a mass filling the entire culdesac and extending upward as previously described. No glands were palpable.

The diagnosis of primary sarcoma of the ovary was made on the age of patient, rapidity of the growth, the location and character of the tumor.

Operation June 22, 1916. The abdomen was opened through a median incision carried for about 5 cm. above and to the right of umbilicus. A single glistening grayish-white tumor was found lying in the pelvis behind the uterus and filling the entire right iliac fossa. All but a small part of the right ovary was replaced by this tumor. The growth was not adherent and was easily delivered into the wound. Broad ligament was considerably stretched and the tube was edematous, and several times its normal size. Left tube and ovary were normal. Appendix was club-tipped. The tumor with

the tube removed; the appendix also removed and the uterus was suspended by a single temporary suture.

*Postoperative Course.*—Patient menstruated on the second day after operation, the flow was rather scant and was accompanied by slight abdominal cramps. The future course was uneventful.

Examination on discharge: Primary union of abdominal wound; uterus small, anteverted, freely movable, no exudates.

Follow-up record: Patient seen November 27, 1916. Feels well and is attending to her work and has gained 5 pounds in weight. Rectoabdominal examination was refused.

*Pathology.*—Gross; a roughly ovoid tumor, measuring  $20 \times 15 \times 10$  cm. On bisecting the tumor it was found to be made up of areas of brain-like tissue with definite fibrous septa.

Microscopical. Low power. Tissue consists of numerous large round cells suggesting an alveolar arrangement. There could be seen numerous blood-vessels, blood spaces, areas of hemorrhagic infiltration, of fibrosis and of degeneration. At one part of this specimen there was connective-tissue trabeculæ in the interstices of which there were scattered numerous cells, characteristic of the predominating elements. Some of the blood-vessels present definite thickening.

Under high power. The predominating cells vary in size averaging about 8 microns in diameter. Their shape is mostly round and in some areas they assume a polyhedral form, this being probably due to a crowding of the cells. The protoplasm of most of these cells is clear while some contain a few large granules and others present a definite granular appearance. The cytoplasm of a few of these cells is crowded with many deeply acid staining granules. This deep stain is present mostly in those cells which appear to be particularly active, as judged by the appearance of their nuclei. A very small number of these cells contain vacuoles and are swollen.

The nuclei show a definite nuclear membrane, are mainly centrally located and present all stages of mitotic activity. Chromatic substance is well defined and many of them show one or more nuclei. The arrangement of these cells is mostly irregular, although in some parts of the specimen there are connective-tissue strands encircling groups of cells which would suggest an alveolar arrangement. These connective-tissue strands are long and narrow, and vary in thickness. They are lined by cells the nuclei of which project into the lumen resembling endothelial cells. There are areas of necrosis in which malignant tissue has been replaced by detritus composed of broken-down neoplastic cells, numerous leukocytes, small round cells and a few plasma cells. There are scattered throughout the specimen in variable numbers small round cells (lymphoid type) of deeply staining nuclei with little or no cytoplasm. Cells with deeply stained eccentrically placed nuclei and a large amount of deeply staining cytoplasm or plasma cells. There are also a small number of eosinophiles. The tissue is richly supplied with blood-vessels. In some places there is erythrocytic infiltration, the blood-vessels not being limited by any definite vascular membrane. This is partly due to

the release of round cells into the tissue by the destruction of the vessel's wall. The vessels are either empty or contain blood elements and in some areas are the site of thrombi. These thrombi are composed of a few red cells and a varying number of malignant cells. In no instance can there be demonstrated a definite connection between the intima of the vessel and the malignant cells.

The clinical significance of this last statement is that the patient may develop metastasis unless these thrombi are limited to the vessels of the ovary or if the thrombi have been destroyed in the circulation. In no part of this specimen is there any suggestion of ovarian tissue.

*Diagnosis.*—Primary sarcoma of the ovary.

DR. ALFRED C. BECK described the

#### KANGAROO WALK IN THE MANAGEMENT OF PUERPERAL RETROVERSIONS.

Up to one year ago from 20 per cent. to 25 per cent. of our hospital cases returned to the postpartum clinic with retroverted uteri.

During their stay in the maternity ward the usual prophylactic measures had been employed to prevent this condition. The discharge examination at the end of the second week usually revealed no tendency toward retroversion. Still, one woman out of every four or five who returned to the clinic a month after discharge had a retroverted uterus.

From these results we concluded that many cases became retroverted during the interval between our observations. The problem then remained to find some means of continuing the prophylactic measures after the patient left the hospital.

This we believe we have found in the use of what has been termed the kangaroo walk. In fact, so great has been the improvement in our results that all of the former measures have been discontinued and we are depending upon this single procedure for our prophylaxis.

The kangaroo walk as we employ it consists in walking on all fours with the palms of the hands on the floor and the knees held as stiffly as possible. Constriction of the abdomen by a corset or skirt bands makes the accomplishment of this frequently very difficult and usually quite uncomfortable. High shoes likewise offer an impediment. Because of these difficulties we advise our patients to perform this exercise in the morning before they dress and at night after they have undressed, when their clothing consists of a nightgown and slippers.

Walking on all fours usually is begun on the ninth day after delivery when the patients are allowed out of bed for the first time. Frequently they are able to cover only a few yards. On each succeeding day the distance is progressively increased until at the time of discharge they continue it for five minutes in the morning and five minutes at night. Before the patients leave the hospital an effort is made to impress upon them the value of faithfully continuing this procedure.

Examination during the latter part of the second week of the

puerperium shows that while the patient is walking on all fours the fundus falls forward and out of the pelvis. It rests on the abdominal wall slightly above the symphysis pubis. The cervix is carried posteriorly and moves slightly with each step. There is a distinct lateral rocking of the pelvis. As a result, involution is stimulated and the tendency to retroversion is markedly lessened.

Since my last report I have examined eighty-two women who have more or less faithfully followed our advice. Of the eighty-two, eight or slightly less than 10 per cent. had retroverted uteri. Three of these eight stated that they had exercised for sixteen days or



Kangaroo walk in the management of puerperal retroversion.

more after leaving the hospital. Two continued for six days and the remaining three discontinued it in less than six days after discharge.

The effect of this exercise on involution was even more marked. Previous to its use it was not uncommon to find patients returning before the time advised because of bleeding and backache. Examination usually showed a soft, subinvolted uterus. In this series only one case returned for bleeding, and it was the rule to find the uterus smaller than was to be expected for the period of the puerperium.

In addition to the accomplishment of the desired results we observed that a much smaller percentage of patients complained of constipation and backache.

#### DISCUSSION.

DR. HERMANN J. BOLDT.—I do not just now recall how long ago it was that an extensive study of retroversion was made abroad

which showed that a large number of puerperal women had posterior retroversions and these malpositions were avoided to a large extent, by not allowing the patients to rest upon the back, but by requiring them to lie on the abdomen. Subsequently when they were discharged they were instructed to lie on their side or on the abdomen for several weeks. Several hundred of these women were reexamined at a later period and only in rare instances was a posterior displacement found.

DR. JOHN O. POLAK said: I must take exception to what Dr. Boldt has just said. We have had considerable experience with the knee-chest position as a postpartum measure and it is interesting to note the difference between women so treated and the one's who have done this kangaroo walk. In doing this walk as has been described the vaginae open and there is a to-and-fro motion of the uterus. I have watched these patients from behind with a Sims's speculum retracting the posterior vaginal wall and there is an actual mobility of the uterus not due to the respiratory movement, which has the effect of massage on the ligaments. This produces a much better result than the postural measures we used before this.

DR. GEORGE W. KOSMAK.—We find in some primiparæ that the uterus will go back and at the same time the patient may present no symptoms and then there are many women who may have a normally retroverted uterus and I should like to ask what the effect would be if we try to correct these. I have not been as successful in persuading my patients to adopt this form of exercise as Dr. Beck seems to have been.

DR. BECK, in closing the discussion.—We try to find out how many women have retroversion before their pregnancy. After replacing a retroverted uterus, we note the amount of invagination and the length of the anterior wall but we were unable to draw any satisfactory conclusions as to which cases had retroversions before their pregnancy. In a previous series in which this procedure was not used, we found that 20 per cent. of our postpartum cases showed retroverted uteri. As I have shown, in this series less than 10 per cent. were retroverted.

DR. CLARENCE R. HYDE read a paper on the

TREATMENT OF PAPILLOMATOUS GROWTHS OF THE OVARY AFTER  
THE POZZI METHOD.\*

DR. RALPH M. BEACH read a paper on

UTERUS BIPARTUS AND ITS INFLUENCE ON LABOR.†

DISCUSSION.

DR. A. J. RONGY.—I do not agree with the last statement that all these cases should have a hysterectomy performed. I saw three cases like those described in this paper. In the first case the attending physician was not able to find the cervix after the woman has

\* For original article see page 412.

† To appear later.

been in labor for seven to eight hours. When I examined the patient I found the cervix on the right side about three fingers dilated, the other cervix somewhat smaller occupying the usual location. The diagnosis of uterus bicornis was then established. The patient was removed to the hospital, labor was allowed to progress, but on examining the patient three hours later I found the left cervix impinging upon the dilating right cervix and obstructing it. In view of the findings I decided to deliver the woman by Cesarean section. The second case was that of a woman that had been married nineteen years, never having been pregnant before. She had been having slight pains for about twelve hours and on examination the doctor could not find the cervical opening. Vaginal examination disclosed two small openings each leading into a different cavity. The fetus was located on the right side. I thought best in this patient to have delivery accomplished by Cesarean section, for in addition to the anomalous condition discovered I found that the patient had just a minor pelvis and that the fetal head was floating above the pelvic brim. In the third case the abdomen was so loose that one could readily feel the pregnant uterus on the right side and also palpate the empty uterus on the left side. The patient gave a history of having been curetted earlier in the course of her pregnancy. Evidently the uterus on the left side was the one that had been curetted. I believe that there is no reason for the removal of the uterus in these cases. There is no more danger of a second pregnancy in these patients than in others who have had Cesarean section performed. When pregnancy does ensue and if they do not abort a second Cesarean can be done. I do not believe we are justified in unsexing the patient because of some mistake in nature by which an additional organ has been placed in her which does not in any way interfere with her health. If it were possible to remove the additional organ during the performance of an abdominal section without endangering her health, I believe it would be a justifiable procedure.

DR. BEACH, in closing the discussion.—When I said that I did not believe that all these cases should be hysterectomized I made a distinction. Where we have a uterus didelphys and the cervix is double we have good drainage and it is the factor of drainage that is important. The other class of cases are those like the specimen shown, the one horn of the bicornate uterus being much higher than the other, where the drainage is not good under any circumstances. I think that where the musculature is poor it is better to hysterectomize the patient.

DR. JOHN O. POLAK read a paper on

“WHEN TO USE THE CURET IN INFECTED ABORTIONS”\*

#### DISCUSSION.

DR. HARRY ARANOW.—I have had a very active service of abortion cases for we have hundreds of cases at the Lebanon Hospital.

\* For original article see page 409.



Our routine treatment in nearly every case that does not improve of itself on packing is to curet. I have read of Dr. Polak's work and have been interested in it, but I do not remember a case in which periuterine infection developed in our hospital as a result of our curetment. Of course these cases should be curetted very carefully and the placenta removed, as far as possible, with placenta forceps and the finger.

I thought while listening to the paper how impossible it is to tell whether a uterus would be infected or not. We know that there has been an attempted abortion and that while the fetus remains in the uterus we are liable to get an infected uterus.

DR. A. J. RONGY.—The Bronx is a very prolific place for abortions both spontaneous and induced. We have had at Lebanon Hospital during the past six years about 625 cases of incomplete abortion. Personally I classify these cases into two groups: (1) Those cases that abort spontaneously. (2) Those which are induced. Our records show that about 40 per cent. of all cases of incomplete abortion are induced either by doctor or midwife. Cases of induced abortion are very likely to be infected because they have been handled and the nature of the interference cannot always be elicited. There is usually some traumatism to the cervix. In these cases the uterus must always be explored in order to empty it of products of conception which might have been retained. This is to be followed by an intrauterine irrigation of 1 per cent. tincture of iodine solution. A sharp curet is never used in these cases. I think that Dr. Polak's advice in cases of spontaneous abortion in which there is no profuse hemorrhage is very sound. The less we interfere in such cases the less likely are these patients to get parametrical complications. As a general rule it may be said that the physician has not as yet outgrown the old idea that every woman who is suffering from incomplete abortion must be curetted.

DR. POLAK, in closing the discussion.—I want to say that we seldom get a tuboovarian abscess from postabortal infection unless we have a mixed infection, but we do get a parametrial exudate with a simple infection. All cases of abortion may be divided into two classes, the clean and the septic, and I have had about the same experience in Brooklyn that Dr. Rongy has had in the Bronx as regards the number of these cases, but we have in the past had a high mortality and morbidity and an amount of parametritis that it seems they do not have in the Bronx. When immediate curettage was the routine and hence we have tried to avoid the mortality and the parametritis by abstaining from interference in cases in which there was active infection. It takes courage to stand by and see a patient with a high temperature and not be tempted to interfere. It takes courage to simply place the patient in the Fowler position and wait until one gets a sterile culture from the uterus before cleaning the uterus out. This method can be used in any case under eight weeks. It is important to avoid trauma where infection is present.

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**IN MEMORIAM.**

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AP MORGAN VANCE, M. D., F. A. C. S.

BY

LOUIS FRANK, M. D., F. A. C. S.,

Louisville, Ky.

"PEACE TO HIS ASHES." So read the records and the passerby murmurs "Peace to his ashes," goes on his way, ignorant that here lies a great surgeon, one of Nature's noblemen. Born May 24, 1854. Died December 9, 1915.

It is meet and fitting that this Society, at its annual meeting set aside an hour for a word about its dead; that it commemorate the deeds (and they are many and great) of those who in the year gone by have gone before—needless for me to remind you gentlemen that we are co-workers in the greatest profession, one which from its very character teaches modesty, self obliteration and shuns the bright light of public attention. Is it not then well that we should pause and sing praise, not to the living, but to the dead? Is it not then proper that we should fire a salute and sound taps? I think it is a custom to be encouraged and fostered and we should feel proud not "to bury our Caesars but to praise" them. To me has been allotted the task of writing a memorial of one of my colleagues and if in this address I do not follow the beaten paths, if perchance I grow a bit personal or appear eulogistic, pray remember that for me the task is one of love, for he of whom I speak was my friend.

Of Scotch Presbyterian stock, and of a family which espoused most ardently the cause of the Union, his early years were spent in a neighborhood which was intensely Southern in sentiment. His family was forced by the exigencies and circumstances of the times to give up their holdings and move to an adjoining State in which he received his early education. It is very likely that the conditions under which his early years were spent had a great influence in making him a man of determined character, of strong prejudice, and of unswerving mind. He graduated in medicine from the old University of Louisville in 1878, having been a pupil of the

PLATE I

AMERICAN JOURNAL OF OBSTETRICS  
AND  
DISEASES OF WOMEN AND CHILDREN  
MARCH, 1917



AP MORGAN VANCE, M.D., F.A.C.S.

BORN MAY 25, 1854.

DIED DECEMBER 9, 1915.



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illustrious Lunsford P. Yandell. During his attendance at the university and for a short time afterwards as was the custom of the time, he was a student in the office of Dr. David W. Yandell, one of the most eminent and famous surgeons of the South.

During his period of medical studies the laws of the land were not what they are to-day and this young man, forced in a large measure to earn his own livelihood during this early period of his life, added to his income by assisting in prosecuting and in furnishing the material for the anatomical laboratory. His reminiscences and recollections of these days furnish very interesting reading, and notes of these were sent some time ago to our colleague, Prof. Kelly of Baltimore, who we hope will shortly give them to the profession in permanent form.

It is quite likely that his anatomical work and his association with the Yandells did much to direct his future professional labors along surgical lines. Being a man of remarkable mechanical turn and having, as we say, probably a genius for mechanics, he sought and obtained a position as resident interne in the Hospital for Ruptured and Crippled Children in New York City. Here his genius had full sway and young as he was in years, devoid as he was in actual experience, he gave to the institution and to the profession, ideas and apparatus based upon mechanical principles of such soundness that many of them are in use to-day. He improved osteotomy, urging and demonstrating the superiority of subcutaneous and bloodless osteotomy with the chisel, over the older methods. During his entire life his natural bent was doubtless toward Orthopedics, but again the necessities of the case in a community, at the time not wealthy, and in a period before surgery had been developed as it is, compelled him to practice in the field of general surgery.

Returning to Louisville in 1881, Dr. Vance began the practice of medicine as the first specialist, south of the Ohio River, to limit his work to Surgery. You, Gentlemen, may understand and appreciate the struggles he had and the fight which he made for specialism in surgery when I say that five years later, when I first entered the study of medicine, the regularity and ethical principles of Dr. Vance's limitation of his work was still being discussed. He maintained his position, however, with dignity and firmness and aided tremendously in putting the specialty of Surgery, and those that have grown out of it, on a firm and substantial basis.

He was for years a member of the American Orthopedic Association, and at the time of his passing away, in addition to his local, county and state societies, he was an honored member of the

American Medical Association, a Fellow of the Southern Surgical and Gynecology Society, and a Founder of the American College of Surgeons.

With all his activity in his chosen profession he still found time to devote to civic duties. In our city stands, as a monument to him, a magnificent public hospital built of enduring brick and stone. In the construction of this hospital, as a result of his oversight and an earnest of his efforts, our city received a dollar's worth for every dollar of expenditure, and our poor and the hospital staff had furnished them an institution with every modern aid for the scientific investigation and treatment of disease.

Dr. Vance was married early in his professional career to Miss Mary Huntoon of Louisville, who was in deed and in fact a help-mate to him throughout his busy life. Of this marriage eight children were born, all of whom are living. He was a devoted husband and father, and in his home was dispensed a generous hospitality.

As a surgeon, he was beloved by his patients; as a man, he was the admiration of those who knew him. His ability and rugged honesty, his firmness of character, and skill as an operator, made him the ideal of the younger men in the profession. Never associated in a teaching institution he was nevertheless constantly surrounded by younger men whom he taught and who profited by his keen observation and vast experience.

Dr. Vance did not have the opportunities, during his student days, of the modern laboratories; but he attached due importance to laboratory work. He had been reared in a school which made keen observation and carefully weighed clinical data a necessity, and a pre-requisite for the exact diagnostician and for the successful operator. In both of these he was a master. He was one of the first who ardently advocated asepsis, and many were the battles which he waged in behalf of its principles. I well remember with what joy he hailed the publication of the monograph of our fellow-member, Robert T. Morris, on "How We Treat Wounds of To-day." He preached Morris to the hospital internes, he expounded asepsis to the doctors who visited his operations, he promulgated it at the bedside and in consultation. In our community he was a "power of righteousness" in all things, but he battled especially hard in behalf of the principles of asepsis. He was among the very earliest to fight in the medical forum for the recognition of appendicitis as a surgical disease, and to insist upon an early operation in

this malady. Of a quick mind, of a pleasant and masterful manner, he did much in spreading this "gospel among the heathen."

To his very intimate friends the best side of his character was shown. Ever open-handed and generous, devoid of guile, honest to a fault, loving his friends with the gentleness of a woman, as loyal to them as a mother to her child, he was always a great big rollicking boy. Those of us who had the opportunity of enjoying this close friendship have felt his loss most deeply. He was a man of tender heart, demanding his "quid pro quo" from the rich, but with his services and time always at the beck and call of the poor.

As a token of the esteem in which he was held by a large number of patients, a voluntary subscription was made in his home city, within a few days following his demise, and sufficient funds were raised to endow a large ward in our Children's Free Hospital, an institution in which Dr. Vance had done much valuable work during his lifetime and which owed its very inception and existence to him. He saw the necessity for such a hospital and by his indefatigable efforts carried his plan for this charity to successful completion. In every walk of life he played his part and played it well. Truly we may say, "Peace to his ashes; Rest to his Soul."

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### NATHAN JENKS,

BY

W. P. MANTON,

Detroit, Mich,

At all times, to record the death of the aged, ripe and full of years and possibly of honors, is no enviable task; but to put down the virtues of a comparatively young life flicked out on the threshold of potential usefulness is trying business. It was my good fortune to have known the subject of this sketch from his childhood up along the years of his development, and later to have been associated with him in his active days, and to have watched his keen endeavors to achieve the largest and the best which fortune held.

Dr. Nathan Jenks was born in Detroit, Michigan, June 3, 1872, and died in that city following a lingering illness, May 29, 1916. He came of sterling stock. His father, Dr. Edward Watrous Jenks, began life in Victor, N. Y., removed in infancy to the State of

Indiana—where his father had large holdings, and founded an academy—and while still a young man, took up his residence in Detroit, where he practiced many years, winning an international reputation as an obstetrician and gynecologist. On his mother's side there is a long line of New England ancestry. Her father, the late James F. Joy, was one of the most distinguished railroad lawyers of his day in the United States, and at one time President of the Michigan Central Railroad.

Nathan Jenks was educated in the public schools of his native city; entered Dartmouth College, the Alma Mater of his grandfather Joy, and was graduated from that institution with the Degree of B. S., just sixty-six years after the latter finished his course.

The same year saw young Jenks at Bellevue Medical College, from which his father had received an *ad eundem* Degree in 1864, where he remained for two years, later matriculating in the medical department of Cornell University, which gave him an M. D. in 1899. Then followed a year of internship in Bellevue Hospital, and finally the return to Detroit to enter practice in 1900. At the very beginning of his medical career he was deprived, by the death of his father in 1902, of that help and encouragement so important and stimulating to one just starting on an untried course. But though thus handicapped, through persistent application and intrinsic worth, he soon began to acquire patients and, before the close of his life, had built up an extensive and paying practice. Dr. Jenks was quiet and unassuming in manner and simple in his tastes; he talked but little and wrote less; but he had that faith in himself which won him many friends and ultimate success.

No duty in his line of work was too insignificant or unremunerative for his undertaking, if he felt that thereby he could lessen suffering or render helpful assistance to his patients. He was a good teacher and indefatigable in his efforts to impart whatever knowledge he possessed to his students, to make them well-equipped and grounded practitioners of midwifery. No call for assistance was ever neglected because of personal disinclination or comfort, and his pupils were loud in their praise of his self-sacrificing efforts in their behalf.

Dr. Jenks was a member of local, state and national societies, as well as of social organizations, and at the time of his death he was President of the Medical Board and Visiting Obstetrician at the Womans Hospital, and Associate Professor of Obstetrics in the Detroit College of Medicine and Surgery. In 1902 he married Miss Elizabeth C. Cady, of Detroit, by whom he had one daughter.

Early in 1912, it became noticeable that his health, never robust,





BORN JUNE 3, 1872

NATHAN JENKS, M.D.

DIED MAY 29, 1916



was beginning to fail; but so engrossed was he in his professional and school work that he paid scant attention to his physical condition until the grim reaper had set his seal ineffaceably and it was too late. During the remaining four years of his life he put up a heroic fight which continued until the end. Although in almost constant pain—on occasions so great that, if attending a patient, he was obliged to retire to another room where he could suffer unobserved until the severity of the paroxysm had passed—he was always cheerful, full of hope and never gave utterance to complaint nor mentioned that he was otherwise than well. And though daily walking in the shadows of the valley, there was no fear in him, and he entered into eternal rest with the same brave and patient spirit which had characterized the long and dreadful period of his sufferings. Valor in war is worthy of all praise; but, in the passing show, before such unaffected fortitude we stand uncovered.

“All leave ourselves, it matters not where, when  
Nor how, so we die well; and can that man that does so  
Need lamentation for him?”

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## REVIEWS.

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GOULD AND PYLE'S CYCLOPEDIA OF PRACTICAL MEDICINE AND SURGERY. Third Edition, Revised and Enlarged. By R. J. E. SCOTT, M. A., B. C. L., M. D. With 653 Illustrations. P. Blakiston's Son & Co., Philadelphia. Price \$12.00 net.

It is only three years since the appearance of the second edition of this work which has again been revised under the able editorial supervision of Dr. Scott. Among the new articles of interest to our readers' attention might be called to the following: ulcer of the bladder, cysts, the Harrison law, mesenteric cysts, narcophin, omentum, pantopon, pulmotor, retroperitoneal tumors, splenectomy and twilight sleep. The favorable reception accorded the earlier editions of this important cyclopedia bespeaks for the present volume an equally favorable reception by the profession. The book is well printed and illustrated with over 650 cuts. It contains an enormous amount of valuable information prepared for ready reference and should constitute an important feature in every practitioner's library.

**MY BIRTH.** By ARMENHOUE T. LAMSON. The Macmillan Company, New York, 1916. With illustrations. Price \$1.25 net.

The title and the preface to this little work lead one to take it up with interest which unfortunately is met by disappointment before one gets very far into the book itself. The authoress states that she has written the book in response to the urgent need of the present youth for true knowledge concerning motherhood and the prenatal life of a babe. By placing the text in an autobiographical form, Mrs. Lamson believes that the process of development will be made more plain and evident to the reader. How successful she has been will be shown by the reception which the book will meet by the lay reading public. To the physician its faults are readily apparent. Written like a diary begun and ended before the birth of the autobiographer, the attempt is made to tell how the different organs were constructed, equipped, and finally adjusted to their future workings. The mother of this unborn babe in the desire for knowledge as to what was going on within her went to her friends and advisors for information apparently without results. The medical books which her doctor gave her failed to fill the want, as "their language was utterly foreign and contained many long scientific terms which she could not read." In view of what follows in her own writing this is certainly a very inconsistent attitude. Accordingly the authoress was impelled to tear away "this cruel curtain of so-called modesty which benefits no one," and proceeds to enlighten motherhood in general with an account of the development of the fetus, which is very complete in most respects. The book begins with the rupture of the Graafian follicle and the meeting of the ovum and the spermatozoon in the tube. Certain very essential features in the process are omitted, namely, those preliminary to insemination. Is this due to lack of courage which the author refers to previously in another connection, or is it because, intended by a woman for women, poor man is to be given little credit in the process? The meeting of the male and female sexual elements is most entertainingly described but the reader may wonder how an unsophisticated ovum is able to recognize the chromosomes in the spermatozoon, for this bespeaks a degree of inherent knowledge on the part of the female sexual element that must be regarded as amazing. An attempt is made to describe the origin of congenital deformities and one finds that the facts become somewhat mixed. Thus hydrocephalus is attributed to the existence of a 'spina bifida.' In the succeeding chapters the development of the various organs of the body is taken up in unnecessary detail, particularly those of the special senses. The development of the embryo is not easy to comprehend even by the biological student. How can a woman equipped with even a good education absorb this mass of detailed scientific discussion? It is surely not a source of comfort to the expectant mother to know and be told in diagrammatic form the process of development going on within her uterus and in consequence brood over the possible errors that may result in cleft palate, harelip, etc.

After several references that will undoubtedly stimulate the reader's curiosity, the solution of the great problem as to the sex of the unborn child is revealed on page 104. The matter quite summarily is dismissed by the statement that it is merely a question of chromosomes, simply a difference of one color granule, one more for the girl, one less for the boy, and this ends up in a characteristic plaint for the inferior sex (?), "blame man-made forces that control her training, education and bringing up." A number of misleading statements were also found. It is claimed, for instance, that fetal movements can be heard by the mother and that the movements of respiration are likewise audible, also that fetal pulsations can be felt through the abdominal wall.

An intelligent woman about to become a mother may desire to know something about the new being which is in process of development within her womb but if in a search for such knowledge she is confronted with this mixture of scientific fact and fancy, of meaningless words and cytological discussions, etc., is she not likely to give up the task in despair? The average woman of the present day is in need of a certain amount of knowledge about herself in the rôle of an expectant mother but what she needs is facts about her pregnancy which will aid her to keep out of trouble and bring into the world a healthy offspring. Her mind should be put at ease and not disturbed by a mass of scientific jargon; she wants to know about herself and her coming baby in a general sort of way but she need not bother her head with chromosomes, Graafian follicles, nucleolus, blastula, gastrulation, primary cell layers, notochord, neural tube, and all the other "anlagen" which go to make up the developing being within her uterus.

Mrs. Lamson's intentions in writing her book may have been admirable. The book is well written, it is well made up but we fail to see how it will find an appreciative class of readers. The number of women who desire the knowledge contained within its pages is certainly a limited one and we must object to her reference that there are no good works from medical sources which would give an expectant mother the desired information about herself. Such books have been written and can be obtained in every medical library or by application to any physician who practises obstetrics.

**THE PRACTICE OF OBSTETRICS.** Designed for the Use of Students and Practitioners of Medicine. By Clifton Edgar, Professor of Obstetrics and Clinical Midwifery in the Cornell University Medical College; Visiting Obstetrician to Bellevue Hospital, New York City; Surgeon to the Manhattan Maternity and Dispensary; Consulting Obstetrician to the New York Maternity and Jewish Maternity Hospitals. Fifth Edition, Revised. Twenty-second thousand. With 1316 Illustrations, including five colored plates and 34 figures printed in colors. P. Blakiston's Son & Co., Philadelphia. Price \$6.00 net.

Dr. Edgar's book has come to be accepted as a standard work in

obstetrics to such a degree that further remarks as to its value are quite unnecessary. The present edition, the fifth, has been thoroughly revised and new articles included on painless labor, pituitary extract and the artificial feeding of infants. In the description of painless labor we are very glad to note Dr. Edgar's conservative attitude in regard to a therapeutic procedure which only a few years ago threatened to become a dangerous practice. He is undoubtedly correct in his statement that the method is not free from danger, that labor is prolonged and that operative interference is more often demanded. The author is convinced that the routine employment of the twilight sleep method is still an open question and that the method should only be employed in selected cases. He does not think that it contributes to a physiological termination of labor, which is the aim of modern obstetrics. In discussing the employment of pituitary extract in uterine inertia the author also cautions against the indiscriminate administration of this drug, especially during the first stage. He considers that full dilatation or dilatability of the cervix is necessary and that anesthesia should be at hand for immediate use, together with preparations for operative delivery in order to avoid uterine rupture. The book as a whole may again be described as one of the best American textbooks on obstetrics, as it is based on the author's personal experiences as teacher extending over many years.

**HOW TO LIVE.** Rules for Healthful Living Based on Modern Science. Authorized by and prepared in collaboration with the Hygiene Reference Board of the Health Extension Institute, Inc. By IRVING FISHER, Chairman, Professor of Political Economy, Yale College, and EUGENE LYMAN FISKE, M. D., Director of Hygiene of the Institute. 8vo. pages 340. Eighth Revised Edition. Funk & Wagnalls Company, New York and London, 1916.

This book is published for the layman and in these days when efficiency is a catch word should appeal to him, for it preaches efficiency in living—how to conserve and enrich our supply of energy and power at the very source. The authors have made a readable and useful book. Their main divisions: Air; Food; Poison; Activity; Hygiene in general; each amply enlarged upon, cover the ground simply and directly, initiating the unsophisticated with gentle care into the mysteries of carbohydrates, proteids, and so on. The book is convincing largely by reason of its spirit of disinterested enthusiasm for the aims and ideals of the Life Extension Institute. It has had a large sale and undoubtedly will do good.

**THE OPERATING ROOM.** A Primer for Pupil Nurses. By AMY ARMOUR SMITH, R. N., Formerly Superintendent of New Rochelle Hospital, New York; Superintendent of Nurses at the S. R. Smith Infirmary, Staten Island, and at the Woman's Hospital of the State of New York. 8vo. pages 294. W. B. Saunders Company, Philadelphia and London, 1916.

This most excellent book takes the pupil nurse as she first enters the hospital and instructs her with great care, simply and directly, in all of the routine duties she will meet with during her hospital training. Beginning when she is an operating-room pupil, it takes her through the positions of junior nurse, anesthetic nurse, scrubbed nurse, and head nurse. It instructs in the management of the main operating room, the sterilizing room, the workrooms. It tells how to maintain asepsis. It is well up-to-date in its formulæ and directions. It gives directions for special dressings and lists of terms and instruments for certain operations, it tells how to prepare, maintain and buy things needed in the operating room. It describes minor work in the operating room or based on its technic, it tells of the preparations by the nurse in orthopedic surgery, how to improvise an operating room in a humble home, and ends with a plea to the superintendent in behalf of the operating room and on the choice and appointment of an operating-room supervisor. The book is well done and reflects the greatest credit on its author; its teaching is forcible and clear. It is far superior to any other book on the subject that we have seen, and should be in the hands of every nurse.

**CARE OF PATIENTS UNDERGOING GYNECOLOGIC AND ABDOMINAL PROCEDURES BEFORE, DURING, AND AFTER OPERATION.** By E. E. MONTGOMERY, A. M., M. D., LL. D., F. A. C. S. Professor of Gynecology in Jefferson Medical College; Gynecologist to Jefferson and St. Josephs Hospitals; Consulting Surgeon to the Philadelphia Lying-In Hospital, the Jewish Hospital, the Kensington Hospital for Women and the American Oncologic Hospital. 8vo. pages 145. Illustrated. W. B. Saunders Company, Philadelphia and London, 1916. Cloth \$1.25 net.

This little book does for the intern, the assistant, or the occasional surgeon what the previous one does for the nurse, and will aid the nurse, the intern, and the surgeon in preparing for the various operations of gynecology.

**GUNSHOT INJURIES. HOW THEY ARE INFLECTED, THEIR COMPLICATIONS AND TREATMENT.** By COLONEL LOUIS A. LA GARDE, United States Army Medical Corps (Retired) Late Commandant and Professor of Military Surgery, U. S. Army Medical School; Professor of Military Surgery Medical Department, N. Y. University. 8vo. pages 457. Second Revised Edition. Prepared under the direction of the Surgeon General United States Army and published by Authority of the Secretary of War. William Wood & Company, New York, 1916. Cloth \$4.00 net.

In the two and a half years that have elapsed since the appearance of the first edition of this book the war now going on has added greatly to the knowledge of gunshot injuries and has necessitated a thorough revision of the work.

The additions made in the present edition refer to the use of certain types of machine guns and the method of fire from these

weapons; the use of the high explosive shell and shrapnel in the mobile artillery of the French and German armies; the composition of the compound rifle bullet of the British army and how it has operated to provoke anew the discussion on dum-dum bullets. The chapter on infection of gunshot wounds has been largely rewritten. This was necessary because of the valuable contributions made by bacteriologists on the invasion of fecal anaerobes in the wounds of the present war. The general treatment of these wounds has also been greatly modified because of the work of Carrel, Gray, Wright and others. Material of much value has been added on the subject of injuries of the superior longitudinal sinus, a traumatism which has developed largely as a result of tangential shots from the high velocity rifle and machine gun. The views of military surgeons on the value of early operations in gunshot wounds of the abdomen have been discussed at length. The value of vessel suture is discussed and the new treatment of septic gunshot fractures by the hypertonic saline solutions and hypochlorous acid methods is given in detail. There is also a new chapter on the casualties of battles.

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## BRIEF OF CURRENT LITERATURE.

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### OBSTETRICS.

**Lipoids of the Decidua.**—A. Gentili and R. Binaghi (*Ann. di ost. e gin.*, July, 1917) say that a previous series of biological and histochemical experiments have shown the importance of the decidua as a gland of internal secretion, and the rôle that the lipoids play in its action. They have instituted another series of experiments in the field of biochemistry with a view to establishing the nature of the various lipoids contained in this organ and determining their essential biological properties. They say that the decidua of the cow is rich in lipoids and neutral fats. The lipoids are represented by a triamidomonophosphate of definite chemical composition, which can be extracted at 40 to 50° with 95 per cent. alcohol, and is insoluble in acetic acid; it presents the characteristics of lutein. This chemical substance is a true lipid. This lipid [injected into rabbits causes inhibition of the ovary, especially in the ovum-producing area and inhibition of the uterus and ovaries. It causes excitation of the mammary glands and suprarenal capsules. As regards the specific action on the mammæ, it influences the secretion in rabbits and in women as well. It influences the mammary gland in the short menstrual cycle, and in the long cycle of pregnancy and the puerperal state. It bears a direct relation to the mammary function of the new-born. These lipoids act especially after pregnancy in causing secretion of the mammary glands. They react also on the portion of the mammæ which acts as an internal secretive organ, and on the cortical portion of the suprarenal capsules as an accelerator, while arresting the other genital organs. In failure to



nurse the action on the suprarenals and ovaries is lacking. Used artificially they produce the same reactions in the mammæ and endocrinian glands. In woman this lipoid produces modifications of the mammæ similar to those of menstruation even to causing secretion of milk.

**Gangrene of the Uterus Following Abortion.**—Mauclair (*Ann. de gyn. et d'obst.*, July-Aug., 1916) states that perforation of the uterus with instruments used for the purpose of causing abortion is not rare, but its discovery is difficult. The perforation is small, and hardly visible in the midst of false membranes and purulent peritonitis. Gangrene may result from such a perforation of the fundus uteri. These gangrenous portions have the appearance of a wedge the small extremity being toward the interior of the uterus, resembling a thrombosis. Leclerc and Crespín injected the terminal arteries of the uterus with colored material, and observed that there is no anastomosis between the circulation of the small arteries of the fundus, each supplying a wedge-shaped portion of the fundus. There is a difference between the circulation in the fundus and the body of the uterus, and the fundus finds itself badly defended against accident to a single arterial cone. A thrombosis of a small arteriole from uterine infection may cause secondarily a gangrenous perforation of the organ. A caustic liquid injected with force against the lining of the uterus at the fundus may cause such a gangrene. We must distinguish two varieties of gangrene of the uterus: 1. uterine gangrene from metritic infection gangrenous in nature, without traumatism or caustic injection; 2. gangrene around a traumatic area, contusion, or perforation. Gangrene quickly develops about a perforation. The author gives histories of two such cases observed by him and one by Job. The latter author has found a number of sizes of cannula that are sold for the purpose of producing abortion. They are made of glass, metal, and rubber, straight or curved; also various caustic solutions are used for injection into the uterus. In one case the whole of the fundus was gangrenous following injection of strong sublimate. Early hysterectomy is the only possible treatment of such a condition.

#### GYNECOLOGY AND ABDOMINAL SURGERY.

**Rare Case of Hermaphroditism.**—Ch. Walther (*Ann. de gyn. et d'obstét.*, July-Aug., 1916) describes a rare case of hermaphroditism operated on by him. The subject was a boy of sixteen years, with apparently well-developed external genital organs, except that one side of the scrotum was small and contained no testicle. He had also a well-developed bust and a menstrual flow occurring through the penis regularly, accompanied by a pain at the site of the supposed undescended testicle. This testicle was found at operation to be an ovary, with a round ligament and tube, and connecting with a small hemiuterus, which descended deep into the pelvis. It would appear that the male elements had developed on one side, and the female on the other side of the body. The female organs were removed, and

menstruation stopped. Whether the spermatozoa of the other side will be active was unascertainable.

**Preoperative Roentgenological Examination in Cancer of the Breast.**—J. W. Lane (*Bost. Med. and Surg. Jour.*, 1916, clxxv, 232) advocates as a routine preoperative procedure the radiographic examination of the chest, pelvis, spine, humeri and femora in all cases of suspected cancer of the breast. Once a cancer of the breast has metastasized to other organs operation is useless and detection of metastases will prevent unnecessary surgical treatment.

**Perforation of the Uterus.**—V. B. Beckman (*Ann. de gyn. et d'obst.*, July-Aug., 1916) tells us that perforation of the uterus is not at all uncommon. He recounts two cases observed by him in which foreign bodies introduced for the production of abortion were found in the abdominal cavity. One of these was a bougie, the other a laminaria tent. Both patients recovered from the operation. Feathers, crochet needles, and other articles have been also found. Not all of these patients succumb if properly operated upon soon after the perforation occurs. If the patient can be persuaded to confess what she has been doing the diagnosis is easy. But under ordinary circumstances it is impossible to obtain any information as to the cause of the abortion. As to treatment, it is not always necessary to remove the uterus. If there is infection the uterus must be emptied by vagina. If the fetus is large, the cervix firm and there is no danger in preserving the uterus colpohysterotomy may be done. It is even possible to temporize for some days when infection is not present. If the foreign body can be felt in the posterior culdesac posterior colpotomy may be sufficient.

**Traumatic Injuries of the Kidney and Ureter.**—H. G. Bugbee (*Annals Surg.*, Oct., 1916, 459) states that the small number of recorded cases of traumatic injuries to the kidney and the ureter, as compared with traumatic injuries in general, may be accounted for in part by the failure to make a correct diagnosis, and in part by the fact that many cases are dismissed as cured following a period of rest and expectant treatment, with temporary amelioration of symptoms. A careful "follow up" system would doubtless throw a different aspect over many of the cases treated expectantly and dismissed as cured. In all probability, many cases of the vague symptom-complex, neurasthenia, might be cleared up by a more careful study of the history and the symptoms in relation to the possibility of traumatic injuries of the urinary system, especially the kidney. In no case, where any of the evidence directs attention to this part of the body, should too much dependence be placed in the cardinal symptoms, as to their absence or their presence.

# DEPARTMENT OF PEDIATRICS.

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## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON PEDIATRICS.

*Meeting of January 11, 1917.*

OSCAR M. SCHLOSS, M. D., *in the Chair.*

DR. ALFRED F. HESS read a paper entitled

#### SUBACUTE AND LATENT INFANTILE SCURVY. THE CARDIORESPIRATORY SYNDROME (A NEW SIGN).

In previous papers it had been established that infantile scurvy may be brought about by a diet of pasteurized milk. We have found that when the use of orange juice was discontinued in the dietary of a group of infants who were being fed on milk which had been subjected to a temperature of 140° F. for thirty minutes some of them in the course of two to four months showed signs of mild scurvy. That these manifestations were in reality scorbutic, and furthermore that they were attributable to pasteurized milk, was proved by their rapid disappearance when orange juice was again added to the dietary, or when raw milk was substituted for the heated milk. The practical deduction from these observations is not, however, that pasteurization should be discouraged, or that milk treated in this way is objectionable, but merely that the important fact should be recognized that it is not a complete food for infants and that it is imperative to give an antiscorbutic in addition. Where this prophylactic measure is observed, fresh pasteurized milk becomes a most valuable food for infants, and is to be highly recommended because of the security which it affords. Our observations have led us to believe that scurvy brought about by pasteurized milk is not at all infrequent, that pasteurized milk is indeed the most common cause of scurvy, and that it induces a type of disorder which generally passes unrecognized.

The stereotyped picture of infantile scurvy is that of a poorly nourished infant, lying with one or both thighs flexed on the abdomen, who on closer examination is found to have bleeding, spongy gums, and enlargement of the lower end of the femur, associated

with exquisite tenderness. This is the syndrome that the medical student carries away to guide him in his everyday practice. This is the florid type, met with only occasionally and requiring merely a routine physical examination for recognition. The commoner form which may be termed "subacute infantile scurvy" is composed of a large number of symptoms which are inconclusive individually and may well escape a correct interpretation. The affected baby is usually in the second half of the first year of life, and does not gain or gains but slightly for weeks. It may be fairly well nourished, but is pale, with perhaps slight edema of the eyelids. The mother or nurse complains that the child is peevish or irritable, and the appetite has diminished. The gums may show merely a lividity or slight periodental hemorrhage, which on subsequent examination is no longer visible, and it may have consisted merely of a ridge of crimson edging the borders of the upper gum, or have been situated behind the upper incisor. The papillæ of the tongue may be markedly congested, and a petechial spot may be seen on its frenum, on the palpebral conjunctiva, or here and there on the surface of the body, more especially where there are erosions, eczema, or other skin lesions. Attention may be called to tenderness of the lower thighs, which in some instances is definite, in others so ill-defined and fleeting that it is impossible to feel convinced of its significance. There may be slight edema over the crests of the tibia, of the kind that does not pit on pressure. The knee-jerks are almost always markedly exaggerated. The urine is found to be normal or to contain some albumin and red and white blood cells. These symptoms do not constitute a rigid entity but are subject to manifest variations. There are other symptoms worthy of note, especially those which have been disclosed by the aid of the Röntgen ray. As described and portrayed elsewhere, the heart may be involved in infantile scurvy. There may be enlargement especially to the right, accompanied by dulness and diminished breathing posteriorly, at the base of the lungs. This type of enlargement is often well shown in röntgenograms, as well as a marked broadening at the base of the heart, at the site of the large vessels. So far as I know, attention has never been called to this latter phenomenon. Röntgenographs of the bones may show the "white line" at the epiphyses, first described by Fraenkel, or a thickening of the periosteum. Too great reliance should not be placed on these signs in making an early diagnosis of this disorder, as neither are invariably present. A pulse of over 150 and respirations of 60 per minute have been found to occur frequently as early signs of this disorder. In one instance of subacute scurvy the pulse could not be counted, and the heart beat was found to be 200 to the minute. This was not a severe case; the baby was in good condition, did not appear ill, and merely showed some tenderness of the thighs and red blood cells in the urine. When given orange juice there was a remarkable response in gain in weight and a disappearance of the other symptoms. The rapidity of the respirations is probably a more delicate indicator of this disturbance than the pulse, and has been found to be markedly

affected when the latter has merely slightly increased in rate. For example, in one instance the respirations were 64, 60, and 64 on three successive days, while the pulse was 124, 141, and 136; in other words, there was a two to one instead of the normal four to one pulse-respiration ratio. The charts presented show very graphically the sharp drop in the pulse and in the respiration rate when orange juice was given. This response proves that it is dependent on and the result of the scorbutic condition. The charts show further that all antiscorbutics are not exactly alike in their chemical nature or therapeutic action; that secondary beneficial results may follow the administration of vegetables in cases of scurvy in which orange juice has been taken for some weeks; that the temperature is affected as well as the pulse and respiration by antiscorbutic treatment.

The type of tachycardia is that in which the pulse is regular and moderately strong, and its rapidity is heightened by the incidence of minor intercurrent infections.

The increase in respirations is a polypnea rather than a dyspnea. The baby is apparently in comfort while the respirations are sixty per minute. In the comprehensive report of the American Pediatric Society there is no reference to involvement of the heart and lungs in scurvy. This cardiorespiratory syndrome is without doubt occasioned by a disturbance of the nervous mechanism controlling the dual system. In view of the fact that the action of the lungs as well as that of the heart is affected, there can be no question of the symptoms being attributable to a primary muscular alteration. Nor can they be ascribed to anemia. The fact that these symptoms yield precipitously within forty-eight hours to antiscorbutic diet does away with all question of their dependence upon malnutrition or anemia. The phenomenon is clearly neurotic in nature and probably due to an involvement of the pneumogastric nerves. We have, therefore, one more link of evidence that the nervous system is involved in infantile scurvy, and that this disorder should no longer be regarded as affecting only the bones and blood-vessels. The significance of showing that infantile scurvy possesses an aspect which requires it to be regarded as a disease of the nervous system is not only interesting in itself, but gains far greater importance when we consider that this association brings it into closer relationship with beriberi, adult scurvy, pellagra, and the ever-increasing number of disorders which are classed as "deficiency diseases," or according to Funk "avitaminosen." In beriberi we find enlargement of the heart, tachycardia, polypnea, and generally increased knee-jerks; in adult scurvy we find, dyspnea, palpitation and hyperesthesia. In pellagra the pulse is frequently rapid and even clinical changes have been found in the central nervous system. Skin lesions are also one of the characteristic signs of pellagra; it is therefore worthy of comment that in infantile scurvy, redness of the skin is not infrequently associated with edema over the tibia. It is also of interest that there is an eczema which develops in infants

in the course of scurvy which yields promptly to antiscorbutic treatment.

It is evident that previous to the onset of scurvy there must be a period during which the equilibrium of the essential substance or vitamine is no longer being maintained, but, on the contrary, a negative balance is in progress. This nutritional state may constitute merely a phase introductory to the occurrence of subacute or of florid scurvy. It may advance no further and may be so slight that the body will be maintained in the latent scorbutic condition for months, until, quite unintentionally, it is brought into equilibrium by the addition of some antiscorbutic foodstuff to the dietary. The diagnosis of latent scurvy is based mainly upon the reaction to specific therapy—the marked improvement when orange juice, potato, or other antiscorbutic food is taken. The symptoms of themselves are suggestive but do not permit of a definite diagnosis. This condition of latent scurvy is probably the commonest type of the disorder and is frequently passed over unrecognized, especially in the larger cities where almost the entire milk supply is pasteurized. Most infants happily are given orange juice before they are six months of age, and they receive a small amount of vegetable or potato before they are much older. There is no contradiction to the giving of a teaspoonful of orange juice at one month to bottle-fed babies and of gradually increasing this amount to a tablespoonful at the age of three months.

Dr. Hess illustrated his paper with lantern slides and charts.

#### DISCUSSION.

DR. L. E. LA FETRA.—It has been very interesting, both this evening and on previous occasions, to hear Dr. Hess describe this mild form of scurvy and I feel that we have learned a great deal about symptoms which we did not suppose were to be interpreted as scurvy. There is no question but that there is a very mild grade of scurvy that must be present before the more florid type and hemorrhagic symptoms occur, and having our attention called to these symptoms, particularly as regards the respiration and pulse ratio, is a very interesting and important matter.

I have been very much surprised that with the increased use of pasteurized milk there has not been an overwhelming number of cases and a more severe type of scurvy occurring. I presume that this must be because so many children take other food in addition to the pasteurized milk in the form of orange juice, potato, vegetables, etc. I have not seen so many cases of scurvy during the past ten years as during the previous ten years. There was a time when I thought pasteurized milk should not be given and for years I advocated only raw milk, but now I feel that some cases of severe septic sore throats may be traced to the use of raw milk and that it is far more dangerous to the baby and that this danger may be avoided by feeding pasteurized milk and an antiscorbutic. The plan of giving certified milk to the great body of our people is im-

practical as the expense would be too great, but by keeping in mind what Dr. Hess has said we may use pasteurized milk without fear of scurvy.

DR. HESS, in closing the discussion.—As I stated in the body of my paper, if these mild cases were looked for we would find many more cases of scurvy. In the last month or two I have seen a considerable number of mild cases; the severe cases are not so frequent as formerly. This is due to a number of factors which make the child automatically less likely to develop the severe form of the disease than formerly. First, it is quite customary to add orange juice to the baby's dietary; second, even pasteurized milk is not entirely free from vitamins, and third, babies are more intelligently fed than formerly. A baby is more likely to get the severe type of scurvy if not correctly fed, or if he has had a number of intestinal upsets than if he went along on a normal course. It, therefore, seems probable that as babies are more intelligently fed nowadays if they develop scurvy it will be in the milder form.

DR. H. SCHWARZ.—I would like to know in how many cases Dr. Hess has produced scurvy. We have tried to produce it with pasteurized milk, and produced other things but have not been able to produce even the mild type of scurvy that he has suggested.

DR. HESS.—I took this matter up at the National Commission on Milk Standards, the position that pasteurization destroyed no enzymes or chemical constituents of milk, and we therefore thought it ought to be tried out. We discontinued orange juice in a certain number of cases and a certain proportion of these children developed mild scurvy.

The same thing is true of scurvy in children as is true of adult scurvy. Before it was customary to have lime juice on board ships a certain number of men, possibly one-half, would develop scurvy while the others would not. The same is true of babies; if a number of babies are placed on the same diet, some will develop latent or subacute scurvy and others on that same diet will show no signs of the disease whatsoever.

DR. L. PIERCE CLARK read a paper entitled

#### SOME REMARKS ON THE MENTAL THERAPY OF EPILEPSY.

There exists a more or less definite type of constitutional make-up in epileptics which has long been recognized by many able neurologists and psychiatrists of the past and this defect accounts in no small part for the so-called "predisposition" to the disease. The essential defects of instincts are egocentricity, supersensitiveness, an emotional poverty both in amount and degree, and an inherent defect of ability to adapt to the so-called normal social life in its broadest significance. The main defect is an inheritable one. This make-up is the primary or original endowment of the potential epileptic individual. It is only accentuated and made more obvious by the after-development of seizures. It is then spoken of as the mental stigma of the disease. The epileptic attacks are not solely

responsible for epileptic deterioration, but the seizures are themselves symptoms and exhibitions of the deteriorating disorder. The seizures do not always indicate the progress and degree of deterioration in any given case. The precipitating mental factors that seem to bring about epileptic reactions in a potential epileptic, whose reactions range all the way from simple disorders of conduct to definite seizures, are types of stress or annoyance which often cause a loss of spontaneous interest, and an intensive regression to day-dreaming, lethargies, and somnolence. The attack occurs as the final break of a too severe mental tension and psychologically may be counted as an intense reaction away from an intolerable irritation.

Sufficient clinical evidence is now at hand for us to outline more definitely the mental therapy of the essential disorder. In the make-up of the potentially epileptic child is included the instinctive inability to take on the adaptive social training of the normal child in the home and school. A morbid display of this latter defect is shown in the display of rages or tantrums. Such children should have special care from the earliest infancy, and particularly by some one specially gifted in dealing with them. Oftentimes this is best done by some one other than the parents. Great tact is necessary to size up the individual conflict of each tantrum episode and judge how it may be properly handled. At one time the child may be sidetracked by directing his interest into another channel; at another he may be completely ignored throughout the entire tantrum, especially if he be too observant of the stress his conduct generates in the family. One should be sure not to offer bribes or rewards for a restoration or proper conduct. Often such concessions are the first irreparable beginnings of a downfall of government and discipline. If the child is to be diverted to some other interest, this should always be supplied early and before any severe repressive measure is brought to bear. In these exhibitions of a balked desire, one should look upon the child's activity as a continuously out-flowing stream of interest unfortunately thwarted which should not be dammed or blocked any more than an active mountain stream should be made to seek some other vicarious outlet. In the most difficult children it is best to teach the child to place his own inhibition on his bad conduct. No tantrum should be allowed to pass without a friendly and sympathetic review of all the circumstances which led up to the disorder. Tireless and tactful restatement of the great *personal* loss the child himself has suffered in consequence is necessary. The issues in question must be plain and simple, comparable with the degree of mental development to which the child has obtained. The explanatory period is often at hand long before one ordinarily thinks it is possible. Several children whom I have known have been given these simple talks in their third year with success. The appeal to altruistic instincts must be postponed until later. A stiffening of the will or a broadening of emotional inhibition should not be begun too early or too intensively as fatigue may supervene. The trained observer gets to know the varied signs of fatigue and is often able to tactfully lower nervous



tension by quieter play. Long before the child displays tantrums, one finds much slighter but equally obtrusive manifestations of maladaptation to the simple processes of life. Often these children must be slowly and carefully inured to the unpleasant demands of hunger and fatigue, or must be slowly accustomed to the hampering and unpleasant contact of the clothing. The potential epileptic child should have less insistent demands placed upon him and for shorter periods of time than other children. His preferences for certain types of dress should also be taken into account and yielded to as far as practicable. An equally wise attitude may be assumed toward the bath and diet, and also applies to the type and character of play. Many an incentive to right conduct once implanted by the right kind of associates bears more fruitful results than many and oft-repeated injunctions by the child's elders.

Infantile and child life are not without stress and conflicts. If the parents are incapable of a sympathetic understanding of what the child is striving for and his main trends of interest, then the work must be entrusted to others. A system of ethics can easily be built up around any line of activity the child may select. The incessant clamoring of the child for variety and novelty of interests is but the natural demand that is his birth-right—to experience as many of the different facets of life as possible. Our concern is not to limit these novelties, but to see that the child shall have a thoroughness of experiencing them. The very completeness with which the difficult child may be made to do this is the safest protection against day dreams, lethargies, and like abreactions from his work and play leading to boredom and irritability—the forerunners of rages and tantrums. The proper inculcation of a good system of nursery ethics is by far the most important object in training such children.

The scholastic training of the epileptic youth must be arranged to suit his peculiar make-up. Often the purely intellectual training has to be omitted and the whole time given over to tutoring the epileptic youth in social behavior. In other words, the school training for epileptics should be intensely individualistic and very modifiable from time to time. The very monotony which the feeble-minded enjoy in any scholastic training is poisonous to the soul of the epileptic. The latter requires novelty and a wide range of educational appeal. Moreover, in a large number of epileptic youths the intellect as such suffers but little or no impairment, and the educational training which these individuals need is little else than that which ordinarily obtains for normals, except to also teach adjustment to work and adaptations along ethical and social lines.

The differences between the feeble-minded and the epileptic are by no means purely academic. They are sufficiently common and far-reaching in significance for educators to take particular note of and govern themselves accordingly, and they should be particularly recognized by those who plan to place the two classes together in one institution. A *laissez faire* attitude of slightly modifying a feeble-minded school to fit the epileptic should not be allowed to prevail. In epileptic youths who have frequent attacks which

prevent consecutive attendance at school much of the education is rendered useless, and the nature of their attacks involves an amount of acute mental degradation, so that they really make very little use of any systematic intellectual training. In those whose attacks are infrequent and who have some intellectual endowment as well as ability to generate and direct, and finally spontaneous interests, a system of educational training is of most value. The colonization of epileptics means most to these individuals. It supplies a continually interesting and varied environment with all the possibilities of modification from season to season, so that monotony and boredom can be avoided by such a system of living. The system of education in the school room must be an essential and integral part of the occupational life of the epileptic, whether he recovers from his epilepsy or not. He needs to have his educational training coupled up with the occupations in which he is engaged and which he cares about. For instance those interested in agriculture should have a system of book instruction and class work that will make for a further elaboration and understanding of all the duties grouped around this particular type of interest. The maximum of school training should be concrete rather than abstract in nature and in the lines in which the patient exhibits the keenest interest and most distinct capabilities. In the absence of a spontaneous interest the remnants of former ones must be pieced together or new ones induced. This can only be carried out by actually living in close contact with the daily lives of epileptics and encouraging and assisting them to start the cold and uninviting task anew each day. Often before anything can be put into operation in the line of work and study the epileptic individual must be given many kindly explanatory talks concerning the treatment, the common sense view taken of his disorder, and the method planned for its riddance. Until a satisfactory talk makes the problem clear to the patient little can be done. The issues to be met in dealing with the problem of the epileptic cannot be met except by an intense preoccupation in the minutiae of the life of such persons. Just as we have noted the inadequacy of considering the tantrum only of the potential epileptic child so we may reiterate the uselessness of the exclusive concern of the epileptic's life at the time of or shortly before his attacks. To do so is to fail, in a considerable number of instances, to lose a proper evaluation of the mental factor making for fits in the individual, as well as to lose sight of the broader principles concerned in the proper mental treatment of the individual case. By avoiding stressful factors and substituting other lines of activity and interests, one may introduce a mental therapy in many cases of utmost moment.

## BRIEF OF CURRENT LITERATURE.

## DISEASES OF CHILDREN.

**Treatment of Rickets.**—E. Pritchard (*Proc. Roy. Soc. Med.*, 1916, ix, Sect. Study Dis. in Child., 91) says that for the disposal of an excess of food the most economical expedient is to store up the excess in the form of a food reserve—for instance, as glycogen or fat. A second method is that of combustion or oxidation to the normal end products, carbonic acid gas, urea, and water. A third alternative depends on the short-circuiting of the oxidation processes, in fact, on the production of incompletely burnt-up products of combustion. This method has the advantage of saving oxygen and of limiting heat production, but the disadvantage of flooding the blood with acid bodies of large molecular size, such as lactic, oxalic, uric, glycuronic, diacetic,  $\beta$ -oxybutyric, and certain other organic acids. If infants are kept in hot, stuffy rooms, if they are wrapped up in multiplicity of clothes, if they are seldom taken out of doors, and if they are given no opportunities for muscular exercise, they will create no demand for food, and consequently any dietary, however small, may be *relatively excessive*, and if excessive must be disposed of by one of the protective methods described. These are the usual conditions which surround the victims of rickets. Under such conditions we could predict that the child would, if he could, lay up stores of glycogen and fat and become obese; that he would show evidence first of excessive combustion by sweating and vascular dilatation of the superficial capillaries of the face and other exposed parts and possibly by disturbances of the heat-regulating centers, and then of suboxidation with the symptoms of an acidosis, with enlarged epiphyses and demineralization of bone; and finally of acyanotic hyperpnea with other serious nervous manifestations. The writer has for many years treated all cases of rickets on the assumption that this is the true pathogenesis of the disease.

**Meningitis in the New-born and in Infants under Three Months of Age.**—H. Koplik (*Arch. Pediat.*, 1916, xxxiii, 481) states that many writers give the impression that meningitis in the new-born is mostly secondary to other diseases, such as otitis, syphilis, or sepsis. This is not so. Many cases escape recognition because the onset is insidious, and it is only after the symptoms have developed to the extent of giving the picture of cerebral pressure that the case is suspected to be one of meningitis. The new-born reacts very slowly to cerebral irritation, and the picture of meningitis is at first masked by rational symptoms which are apt to mislead. In the new-born even with cerebral symptoms the body remains limp; we do not have the active development of rigidity of the neck, Brudzinsky and Kernig signs seen at a later period of infancy. The objective symptoms which would lead us to suspect a meningitis in the new-born are convulsions, repeated with convulsive movements of the eyes and muscles of the extremities in the intervals, fever, constant restlessness, with vomiting; with this a suppressed groaning

respiration and a temperature curve, at first very high, then gradually remitting or intermitting, and, finally, falling to or near the normal. Most of the cases after a week's duration develop a rigidity of the neck and a drawing back of the head, which indicates clearly the nature of the affection. The prognosis of meningitis in the new-born is very grave. Of twelve cases, of which was made an actual examination bacteriologically of the fluid obtained by lumbar puncture, four contained streptococcus in pure culture, three pneumococcus, four meningococcus, and one coli bacillus, the last as a result of systemic infection from a coli pyelitis. Lumbar puncture is most apt to meet insurmountable obstacles in the new-born, where the cerebral canals leading into the subdural space are exceedingly narrow in caliber, and at the third or fourth puncture the fluid is apt not to flow from the subarachnoid space. Ventricular puncture is a very unsatisfactory procedure. The new-born seem to go into a condition of collapse after the ventricular puncture, from which they do not recover. In those cases followed in maternity institutions it was found that the infants were born after a stormy or prolonged labor; that methods of resuscitation had been rigorously applied, among others, mouth to mouth and catheter suction. The natural inference in these cases is that the infection took place possibly from the mouth of the accoucheur to that of the infant.

**Reliability of the Electrical Diagnosis of Tetany and Electrical Values Found in Normal Children.**—J. B. Holmes (*Amer. Jour. Dis. Child.*, 1916, xii, 1) examined 434 cases, 400 of which were regarded as normal. Having determined the galvanic electrical values that may be expected in normal children in each year of life and compared these with his findings in cases of tetany he states that the appearance of cathodal opening contractions under 5 ma. (and in the absence of certain conditions already mentioned) in children under five years of age is pathognomonic of tetany. Cathodal opening contractions are, however, not infrequently absent in cases of clinical tetany. The appearance of anodal opening contractions with less current than that causing anodal closing contractions, and under 5 ma. during the first six months of life is probably pathognomonic of tetany in all cases; their appearance with less current than that causing anodal closing contractions and under 2 ma. is probably pathognomonic up to the fourth or fifth year; thereafter it is of little significance. The appearance of a Chvostek phenomenon under two years, in the absence of birth trauma, indicates tetany; under four or five years of age it is highly suggestive of tetany; its appearance in the highest grade (Grade 3, Escherich) is suggestive throughout childhood. After three years the Chvostek phenomenon is not infrequently found in milder grades in apparently normal children. The occurrence of any one of these symptoms in association with a clinical history of tetany is to be considered conclusive evidence of tetany. The determination of the electrical values is an extremely useful, but not always an infallible, means of diagnosing active or latent tetany in childhood. It is most useful in infancy. Like other clinical tests, this one has definite limitations that must be recognized.

**Therapeutics of Acute Lobar Pneumonia of Children.**—Adolf Baginsky (*Arch. f. Kinderheil.*, Bd. lxiv Heft III–IV, 1915) gives histories of a number of cases of pneumonia in children, which were treated very simply, but which nevertheless all recovered, to show that if we give the “*vis medicatrix naturæ*” a fair chance by assisting it with proper feeding and hygiene we shall cure most of our cases, without any elaborate system of therapeutics. These cases were treated by milk diet, hygiene, and ice applied to the thorax, without any drugs taken internally. He made use of no antipyretics, no heart stimulants, no expectorants. He regards painting the chest with iodine, hot baths and sweat packings, and light baths as useless. Without their use resolution will take place just as well as in the mildest cases. He does not think that he can give any precise rules as to the therapeutic care of every case of pneumonia, since the course and complications of each must cause some variation in the treatment. But he believes that it will be of great advantage if all medical students leave the hospitals with the conviction that in children at least we may treat pneumonia simply and without the use of a long array of antipyretics, heart stimulants, and expectorants.

**Early Symptoms Suggesting Protein Sensitization in Infancy.**—B. R. Hoobler (*Amer. Jour. Dis. Child.*, 1916, xii, 129) believes that permeability of the alimentary tract to unaltered protein in certain infants has been fully demonstrated. The absorption of this unaltered protein produces a group of symptoms, mild at first, and later increasing in intensity, which he believes to be an expression of “suppressed anaphylaxis.” Perhaps the earliest manifestations of sensitization appear in the form of lesions of the skin. There may be the mildest erythema, either localized or general, or it may take the form of blotchy areas, often of very intense color. There may be urticaria, which may consist of a single wheal or be of the giant type or any degree between these forms. Usually the earliest forms are single urticarial wheals and are often considered by the mother the result of insect bites. There may be rashes, which are usually of the miliary type, and are found particularly about the neck and chest. This form is often thought to be due to dressing the infant too warmly. There may be a mere roughening of the skin, without exposure, similar to chapping. There may be symptoms which originate from vasomotor disturbances in the mucosa of the upper air tract. These exhibit themselves in (a) sneezing, (b) snuffles, and (c) rubbing the nose. The symptoms relating to the respiratory tract are usually of much later occurrence than those of the upper air tract. They are (a) wheezing, (b) periods of increased respiration, and (c) cough. The symptom of increased respiration is at first without dyspnea, but later with some dyspnea. The cough is often very persistent, but usually is of short duration and disappears as suddenly as it comes on. The symptoms relating to the digestive system often appear in the presensitization period and consist of an acute digestive disturbance. This is followed later by occasional vomiting attacks, in which an entire feeding may be ejected suddenly

without any apparent cause. This vomiting is often accompanied by one or two urticarial wheals or by some one of the numerous skin manifestations. The symptoms arising from some disturbance of the nervous system include the conditions generally described under the words irritable, restless, fretful and sleepless. All of the above symptoms come and go with great rapidity. Not all of them occur together; often but one of them occurs and quickly disappears. If the food protein is constantly increased, as is usual in bottle-fed infants, the manifestations of sensitization appear more frequently, remain longer and are more intense; thus many transient erythemas and fine rashes become displaced by eczema, which appears first only in a few spots, as on the cheeks, over the fontanel, and behind the ears. If protein is persistently increased, the eczema gradually spreads until the entire body surface may become involved. In like manner the respiratory symptoms become more prominent. The wheezing is more marked, the breathing more labored and eventually the extreme manifestation appears in the form of an attack of asthma. Severe eczema may be associated with frequent attacks of asthma. By early recognition of such cases, followed by proper food modifications, the symptoms may entirely disappear or be greatly ameliorated.

**Infantile Scurvy.**—A. F. Hess (*Amer. Jour. Dis. Child.*, 1916, xii, 152) says that although pasteurized milk is to be recommended on account of the security which it affords against infection, we should realize that it is an incomplete food. Unless an antiscorbutic, such as orange juice, the juice of orange peel, or potato water is added, infants will develop scurvy on this diet. This form of scurvy takes some months to develop and may be termed subacute. It must be considered not only the most common form of this disorder, but the one which passes most often unrecognized. In order to guard against it, infants fed exclusively on a diet of pasteurized milk should be given antiscorbutics far earlier than is at present the custom, even as early as at the end of the first month of life. In the course of the development of infantile scurvy, growth, both in weight and in length, is markedly affected. Under these conditions, weight ceases to increase, and a stationary plane is maintained for weeks or for months. There is a quick response, however, on the administration of orange juice or its equivalent, indeed supergrowth is thereupon frequently manifested. If, however, an infant has been underfed, an increase in weight may continue throughout the development of the scorbutic condition. Cessation of growth, as well as marked increase in growth, may manifest themselves, although the caloric value of the food remains unchanged, depending merely on the withholding or the addition of essential foodstuffs to the diet. Measurements showed that growth in length is also retarded during the protracted development of infantile scurvy. This is of greater biologic interest, as simple malnutrition usually does not affect this function in the infant. In this particular, supergrowth also follows the addition of the essential foodstuff, showing that the growth impulse has remained uninjured and has been merely held in abeyance.

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APRIL, 1917

EDITORS

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GEORGE W. KOSMAK, M.D.



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## ORIGINAL COMMUNICATIONS.

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### TISSUE TONE AS AN INDEX OF VITAL RESISTANCE, WITH SPECIAL REFERENCE TO PROLAPSE OF THE UTERUS.

BY

R. R. HUGGINS, M. D.,

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ONE of the hardships of surgical work is the difficulty in making an accurate estimate of the ability of the patient to withstand certain operative procedures necessary to restore health. Improved technic and better judgment as to the time when to operate have reduced the risk very materially, so that deaths from the ordinary postoperative complications, such as peritonitis and hemorrhage, seldom occur.

The future problems for the surgeon, so far as operative mortality is concerned, deal largely with better knowledge of the horse-power of his patient. When there is no relief for the patient except that afforded by surgical measures, notwithstanding an element of risk, the responsibility must occasionally be accepted and the true surgeon will accept the risk without thought of his mortality. In a handicapped patient where the danger of operation is largely a question of the ability of the patient to withstand the shock and fatigue incident to operation, and the strain of postoperative distress, the most careful study is necessary to determine whether a given operative procedure may be undertaken with safety. Independent of the usual contraindications, such as damaged kidneys, lungs, and marked cardiac disease, there is a condition which is characterized by poor tone throughout the entire muscular system,

including the heart, which is most difficult to measure. The underlying cause may be obscure, and unless its presence is appreciated an occasional fatality will be registered that should be avoided. The heart sounds may appear normal, but if studied carefully the heart shows marked absence of muscular tone and seems flabby. When further examination reveals this same condition throughout the body it is of great prognostic importance. It is unfortunate that the proper estimate of strength under these conditions must still remain one of personal equation and that no instrument of precision has yet been devised whereby the real horse-power of the circulatory system may be revealed. After years of stress, due in part to some definite pathological condition or to other changes which may be secondary or perhaps independent of the former condition, the patient is presented to the surgeon as the court of last resort. It is in this type that the utmost caution must be exercised and where the keenest judgment is necessary to calculate the amount of strain that the patient already handicapped may endure. The underlying condition may best be described as one of chronic fatigue and the tissue changes which occur may be directly due to long-continued absorption of toxins, starvation, or to changes in the sympathetic nervous system which remain obscure and are not understood. The excursion undertaken by the patient when surgery is employed is best described by comparing it with a Marathon race. In major operations the patient is subjected to almost the same test that comes to the athlete under severe strain.

With any of the forms of inhalation anesthesia the heart is driven at a rate much higher than normal. It is obvious that after a certain time has elapsed there comes a period of exhaustion in the circulatory apparatus just as it does in all muscular tissue after severe tests. The use of local anesthesia is a beautiful demonstration of what part the anesthetic takes in aggravating or increasing the amount of muscle fatigue incident to any operative procedure. The problem for the surgeon to decide then is how far and with what speed can a given heart be driven so that the patient may remain within the limits of safety. The study of our cases show that it is not only failure of the cardiac muscle to withstand the stress, but in some instances there is exhaustion of the muscular structure of the stomach and intestines to such a degree that death ensues from what has been termed paralytic ileus. Occasional reports in literature of death from this cause following simple procedures, as, for example, minor operations for the cure of prolapse of the uterus, lead to the belief that this complication is due to this cause rather

than to some obscure effect upon the sympathetic nerve centers. So far as the study of the heart is concerned we must keep in mind that it is constructed of the same element as the blood-vessels, and that it is but a differentiation of the muscular envelope every part of which is capable of maintaining a certain pressure. The maintenance of the circulation is not carried out by the heart alone. The blood-vessels constitute an integral functioning factor. It is difficult to determine how much weakening of either factor may lead to dilatation, but it is important that the intimate relationship be kept in mind. The variations which may occur are so complex that we should be able to make accurate measurements upon the envelope as a whole, if we are to be certain of its efficiency. There is absolutely no difference between a weakened biceps and a flabby heart muscle, and both may result from changes in the tissues caused by some obscure toxemia or chronic infection. The object of this discussion is to call attention to the necessity for more accurate estimate of the tissue strength in general, for in our judgment much depends upon a keen appreciation of the amount held in reserve by every patient, more especially the type under consideration. How can this problem be solved? Study of the patient's history together with careful observation are and will always remain the most reliable aids in forming an opinion as to the probable amount of reserve strength in the given patient. Inquiry should be made for the presence of shortness of breath on exertion, and if advisable the effect of exertion should be noted. Much may be learned by the careful examination of the resistance and consistency of the muscles at rest and in action. A history of any disturbing condition in the function of the thyroid gland always suggests the probability of friable muscular tissue lacking both tone and strength. The same is true in the presence of fibroid tumors and in some cases of intestinal stasis. Every case of chronic infection of the gall-bladder is below par in this respect, and the high mortality following operations upon this organ is largely due to weakness not only of the heart itself but that of the entire muscular system. Accurate observation of the blood pressure, with particular attention to the pulse pressure, should be made. In our service this is routine in the examination of all patients. Recently Dr. Cashman, my associate, conceived the idea of making observations upon the effect of exercise on the pulse pressure in all patients where there is any suspicion of general muscular weakness. The border-line cases studied from this viewpoint are too few to draw conclusions, but our experience leads us to believe that it will be of great assistance.

The following cases are good examples of the apparent value of the pulse-pressure test:

Mrs. C. B., aged fifty-five years. Admitted to St. Francis's Hospital, October 20, 1915.

Chief complaint, vaginal bleeding and general weakness.

*Family History.*—Unimportant.

*Past History.*—Aside from some disturbances of the digestive organs at irregular intervals the general health has always been fairly good until the past year. Menstruation began at the age of fifteen years, and was always normal; the menopause occurred at the age of fifty-two years. Has had five children, all of which were delivered in a normal way. No miscarriages.

*Present Illness.*—For the last year the patient has noticed a slight bloody vaginal discharge which occurred at irregular intervals, sometimes every day and then disappearing for quite a long period. Is not associated with any pain, but for the last few months patient has grown very nervous; has been greatly depressed and inclined to worry about her condition. Examination reveals a well-nourished woman who, when examined in the dorsal position, presents little evidence of ill health. Is suffering no real discomfort, and has good color. There is nothing unusual to note in the way of special examinations except the absence of good tissue tone, which is made apparent by the flabby condition of the muscles in general and a history of some swelling of the extremities. Vaginal examination shows a marked relaxation of the vaginal wall, due to separation of the muscles of the perineum and fibers of the levator muscle. The cervix is considerably enlarged, containing much scar tissue. There is a small polypus, the size of a pea, about 1 cm. over the external cervical opening. There are a number of other small excrescences polypoid in nature over the surface of the cervical mucosa. This tissue bleeds freely when touched, but there is no marked friability of the mucosa, as one would expect, from the absence of malignant change. The cervix when in standing position protrudes from the vulva, and there is marked relaxation of the uterine ligaments. The uterus is normal in size and freely movable. The adnexa are normal. The tissues are all softened, and a prolapse which has increased perceptibly within a few months has apparently been precipitated by weakening of the muscular tone incident to constitutional change. Examination of the heart as made by Dr. Cashman shows an accelerated rate. The pulse pressure on reclining is 49, when standing 20. After several trips around the room, 18. Reclining in bed a few minutes later, 49. Impression heart muscle stands strain poorly. A note made by Dr. Heard, November 12, 1915, stethoscopic edema rate, accelerated 90 to 100. No indication of pericardial involvement or valvular disease. Boundaries of heart cannot be determined on account of large mammæ.

*Diagnosis.*—Insufficient myocardium. Electrocardiograph first plate strongly resemble flutter curve but this is not confirmed by subsequent electrocardiograms. Wassermann test was negative and

the sulphophenolphthalein test for kidney function showed a total of 73 per cent. at the end of two hours. This patient was kept at rest in bed for a period of two weeks at the end of which time owing to the possibility of the presence of malignancy operation was done under local anesthesia. The cervix was amputated and the posterior vaginal wall repaired. The patient did not complain throughout the operation, and made a good recovery. Examination of the cervix showed no evidence of malignant change. Patient was discharged at the end of twenty-four days. There was great improvement in her general condition. Patient had made a satisfactory recovery.

Mrs. E. S., aged forty years. Admitted to St. Francis's Hospital, September 29, 1915.

Chief complaint, prolapse of the uterus and bladder.

*Past History.*—Has always been strong and well until the past two years, except for a period of time after fifth child was born, which was ten years ago. There was some prolapse which lasted for a few months and then disappeared. For the last few months she has been having headache and vertigo and is short of breath on exertion. Has feeling of distress and palpitation over precordium at times. Menstruation began at the age of sixteen years and has been somewhat irregular, but the flow has been normal until the last few months, when it has increased. Has no pain during menstruation, but since illness began headaches and vertigo are worse during that period. Patient is the mother of seven children, all living and well. The labors have all been difficult. Last baby was born in 1913, and recovery was slow after this delivery. Patient has always worked very hard and taken sole care of the children, doing much of the housework. Patient is a well-nourished woman, having good color and very healthy in appearance. Tissues are soft and the consistency very flabby. Vaginal examination reveals a complete prolapse of the uterus, with large cystocele and rectocele, which condition, according to the patient's history, has become much aggravated within the last few weeks.

Examination note on the heart by Dr. Cashman, September 30, 1915: Apex beat barely felt, sounds heard best in the fifth intercostal space inside of the nipple line. On percussion, heart area is not enlarged. On auscultation there is a low-blowing systolic murmur heard at the apex and over the base of the heart, which is not transmitted to the axilla. Heart sounds are regular but not strong. Systolic blood pressure, 118; diastolic, 80. Pulse pressure, 38. After the patient walked up and down the room rapidly the pulse quickened and remained rapid during the examination, with considerable respiratory change in rhythm, becoming more rapid during inspiration. Pulse pressure after exercise, 8; systolic being 120 and diastolic 112. Heart murmur not increased after exercise; impression weak heart muscle.

Examination October 9, 1915. Patient has been in bed since admission. Systolic blood pressure, 108; diastolic, 72; pulse pressure, 36. After standing systolic pressure is 116 and diastolic 94.

After exercise systolic pressure is 106 and diastolic 94; pulse pressure 10.

October 15, 1915. Patient's heart muscle shows very little signs of improvement, and as she is unwilling to remain in bed for a prolonged period of time until we feel satisfied that the muscular tone is sufficient to withstand the ordeal of an operative procedure, she is allowed to return home. I am informed by her physician that she remained in bed for several weeks at home and is now much improved. Is attending to her usual duties and there is great improvement in the discomfort incident to the prolapse of the uterus.

No test has as yet been suggested which will give an accurate measurement of the functional capacity of the heart. Perhaps the best method, and one which offers the greatest possibilities, is that described by Graüpnér and partly confirmed by the interesting work of Barringer (*Archives of Internal Medicine*, November, 1915, xvi, No. 5, and March, 1916, xvii, No. 3). The essential features of this test are the deductions made from the form of the curve of the systolic blood pressure after measured amounts of work. Barringer states that although he is unable to confirm some of his results, that he believes that the method of making frequent readings of the pulse rate and systolic pressure after measured amounts of work furnishes the key to this problem of determining the heart's efficiency. These experiments are carried out by the bicycle ergometer and with dumb bells. He concludes that in the pulse rate and blood pressure reactions to graduated work we possess a valid test of the heart's functional capacity. If the systolic blood pressure reaches its greatest height not immediately after work, but from 30 to 120 seconds later or if the pressure immediately after work is lower than the original level, that work, whatever its amount, has overtaxed the heart's functional capacity and may be taken as an accurate measure of its efficiency. This article should be read by those interested in this subject, for it may be applied to the determination of cardiac weakness referred to in this paper just as in cardiac insufficiency from valvular disease.

A study of "soldier's heart," or "the irritable heart of soldiers," approaches the subject from another standpoint, and was the basis of a discussion held at a meeting of the Section of Pharmacology and Therapeutics of the Royal Society of Medicine on January 18 (*British Medical Journal*, January 22, 1916), to which Sir James Mackenzie and his collaborator, Dr. R. McN. Wilson, contributed the opening papers. The disorder attracted much attention during the American Civil War, and was exactly described by Henry Hartshorne in a paper published in the *American Journal of the*

*Medical Sciences* in 1864. In the same year the British Government appointed a committee to inquire into the heart conditions prevailing in the army. It sat for five years, and came to the conclusion that the form of accoutrement then in vogue, by restricting the heart's action, caused its "irritability." One of its recommendations was that the principle of the brace should be adopted, and this was afterward acted upon, but the irritable heart remained. Another theory, initiated by Surgeon Arthur Davy in 1876, has proved equally fallacious. In his opinion "setting up" drill was the cause. It acted, he said, by overexpanding the chest and thus dilating the heart. But, as Dr. Wilson points out, cases are now met with among soldiers who have had little or no drill in circumstances where this cause could be excluded.

The observations of Sir James Mackenzie and Dr. Wilson suggest that the malady should be regarded in an altogether different light. They have examined about 400 soldiers who have been certified and treated as having heart affections. In their opinion, in at least 90 per cent. of these, the heart is not primarily at fault, and the treatment suitable for them is widely different from that appropriate for patients suffering from heart failure. They consider the condition one of general exhaustion, and the circulatory symptoms but evidences of a general state. In the majority of the cases the onset of the exhaustion was found to be connected with an infection; in a few a history of very strenuous life preceding the symptoms was alone obtained. These observers make a clear distinction between the symptoms arising from infection of the heart and from cardiac failure on the one hand and those of the "poisoned" heart, as they term the "irritable heart" of soldiers, on the other. The principles of the treatment which they recommend are a natural corollary of this conception of its etiology; they are directed to increasing the general health of the body in such a way as to increase the natural resistance to infection, to eliminating toxic influences, and to bracing up the patient bodily and mentally.

A kidney function test should be made previous to every major operative procedure. The value of the x-ray in certain instances should not be overlooked. The electrocardiograph is an instrument from which much was expected in the revelation of obscure conditions in the heart muscle. Dr. Heard has been very kind in his endeavor to help us in the elucidation of some of these problems, and the results will be embodied in a later report. I am convinced that it is another important aid, but whether it is of great value in measuring the actual strength of heart muscle has not yet been determined.

We desire to emphasize the importance of another danger signal which may be observed by the gynecologist. A keen appreciation of this danger may be in some instances of great importance. We have been impressed with the frequency with which loss of tissue tone together with a flabby heart muscle is found in prolapse of the uterus in certain individuals. Our records show that in 1000 major gynecological operations there were 15 deaths exclusive of several deaths which occurred in different varieties of infection following delivery. Three of these deaths followed operative procedures for the relief of prolapse. In every instance we were not unmindful of a certain risk, and operation was undertaken after careful consideration of the margin of safety and the operative procedure adopted, which might give the least amount of stress. This experience together with the necessity of refusing operation to several patients with prolapse on account of apparent muscular weakness has led to the conclusion that in certain cases of prolapsus uteri serious consideration should be given to the study of the general condition of the patient with especial attention directed to the heart muscle. In the majority of all cases of prolapse of the uterus it occurs because of several different factors. The absence of support from below, increased weight of the uterus, intraabdominal pressure from above and elongation or stretching of the muscular and ligamentous supports of the uterus include briefly the essential causes. A given case may be due to one or all of the above-mentioned conditions. It is important in every instance to give careful attention to the analysis of the case, and if it should appear that the principal cause is due to relaxation of the muscular and ligamentous supports, careful study should be made of the muscular tone of that individual. This is true particularly when the prolapse develops rather suddenly, the patient seeking advice a few weeks from its onset. Not infrequently the ordinary predisposing causes may have been present for years, that is, absence of the pelvic floor with wide separation of the transversus perinei and levator muscles, with perhaps an enlarged uterus, but suddenly for no well-defined reason, the uterus becomes prolapsed to the second or third degree. This means the addition of another factor, namely, sudden weakening of the muscular and ligamentous supports dependent upon some constitutional change in which the tissue weakness is a general one. Careful analysis of this predisposing cause may reveal widespread weakness of all tissues, and unless this condition is recognized the resistance of the patient may be greatly overestimated. We have then in the prolapse local evidence of a condition which is



widespread and an index which suggests most careful study of other organs. Prolapse of a moderate degree is often found when there is loss of tone due to general weakness which disappears as soon as the individual is restored to normal. This not infrequently occurs in patients who subject themselves to a strict diet in order to reduce their weight. As soon as strength is restored the organ returns to its normal position. Occasionally, patients give a history of recurring attacks of prolapse, the uterus appearing at the vulva accompanied by many annoying discomforts. After a period of rest and general tonic treatment it becomes restored at least partially to its normal position and the local discomforts disappear. Sooner or later, however, the displacement recurs and operative measures become necessary if permanent relief is obtained. In several instances I have assured patients that operation was the only method of relief, but they did not agree, and after being treated by an osteopath or someone skilled in the wonderful science of suggestion they have been temporarily relieved of their symptoms, meanwhile rejoicing in their escape from the surgeon. Much is heard from the surgeon at the present time about his low rate of mortality. We do not wish to minimize the importance of these reports, but is it not time that more frankness be exhibited and careful scrutiny be given to the study of our deaths? Everyone who devotes himself exclusively to surgery, either general or special, should not be ashamed of his mortality at the present time and there is no reason why every death should not be reported and studied in the minutest detail. For this reason we beg to submit the report of three cases which died after operations rather simple in character for relief of uterine prolapse.

Mrs. C. K., aged forty-seven years, admitted to St. Francis' Hospital June 20, 1910.

*Diagnosis.*—Laceration of the perineum, prolapse of the uterus, and chronic appendicitis.

*Present History.*—Has had ten children. Present trouble began eighteen years ago after birth of fourth child. Patient is quite stout, weighing 160 pounds. Careful examination did not reveal any unusual condition except that there seemed to be some considerable loss of muscular tone. Patient had not been feeling very well for several weeks previous to admission. Aside from the condition of some weakness in a general way patient seemed normal. Heart sounds were clear and no apparent enlargement present. Urine negative. Examination did not reveal any apparent contraindications to operation.

*Operation.*—D. and C. Repair of perineum, suspension of uterus, and appendectomy. Ether anesthesia. Patient's pulse ran an un-

usually high course throughout the operation, and remained high. That evening at 10 P. M., pulse was running 120 to 130. Patient unusually restless. The next day there was considerable nausea and vomiting; pulse rose to 135. There was an unusual amount of distention which yielded to enemas. Pulse became somewhat irregular. On the fourth day patient's bowels moved three times and she always expelled large quantities of gas after the administration of enemas. Temperature, 99°; pulse running from 130 to 140. Patient died on the fifth day. The pulse continued to run very high and the abdominal distention gradually increased. There was no evidence of any obstruction of the bowel or of peritonitis. The death seemed to be due to weakness of muscular structure of the heart and of the intestines as well.

Mrs. L. B., aged forty-eight years, admitted to St. Francis' Hospital, November 6, 1914.

*Diagnosis.*—Laceration of the perineum, cystocele, chronic endocervicitis, prolapse of the uterus. This patient, aside from an attack of typhoid fever at the age of twenty-five years, gave a history of perfect health until three months before admission. At this time she first noticed the uterus coming out of the vagina, and since that time has not been feeling well in a general way. Has complained of being tired and unable to withstand fatigue. Has had some shortness of breath on exertion. Patient appears in perfect health, well nourished, and color unusually good. Physical examination reveals slight irregularity of the pulse. For this reason she was placed in bed and kept there for a number of days, at the end of which time the pulse seemed perfectly regular, and while the heart sounds seemed somewhat distant they were perfectly clear. On November 14 her condition seemed very good and it was decided that there would be no unusual risk in operation. The operation consisted of the repair of the cervix, cystocele, and rectocele, shortening of the round ligaments, a procedure unaccompanied, as a rule, by any great amount of shock. It was noted at the time of operation that the tissues were unusually soft and friable. Ether anesthesia. Patient was unable to void after operation, and there began on the following day persistent distention of the intestines accompanied by vomiting. Gastric lavage relieved for a few hours as did the use of pituitrin and the repetition of enemas. This condition persisted for three days, when, owing to a possible doubt as to the presence of some mechanical obstruction due to the operation, the abdomen was again opened. No mechanical obstruction was found nor was there any evidence of peritonitis. The intestines were distended throughout and while an enterostomy was done 4 inches from the ileocecal valve the distention continued without relief. The patient died two days later from paralysis of the entire intestinal tract commonly known as paralytic ileus. There seemed no doubt in this patient that the death was due to lack of horse-power and that it was located not only in the cardiovascular system but in the unstriated muscular fibers of the gastrointestinal tract. A death of this kind is extremely difficult to understand and it might be due to some dis-

turbance of the internal glandular secretions which in some way disturb the sympathetic nervous system. A case of this kind, however, supports the argument advanced that the prolapse was an important index and was a danger signal which, if properly appreciated, might have prevented a surgical death.

Another case, which is a good object lesson, was that of Mrs. J. W., aged forty-six years, admitted to St. Francis' Hospital, October 13, 1914.

*Diagnosis.*—Prolapse of uterus, with possible malignant change in the cervix. This patient had been having irregular atypical bleeding from the uterus for some time previous to admission, and it was necessary that a careful examination be made of both cervix and the body of the uterus. This patient was very stout, weighing 215 pounds. She gave a history of having considerable nervous trouble for some months. Had varicose veins for thirteen years. Very difficult to make satisfactory examination of her heart on account of large amount of fat covering chest. The right border starts at the midsternal line; sounds at apex clear and no murmurs. Impression gained is that the heart muscle is below par. Blood pressure, systolic, 110. On account of the possibility of malignancy and the presence of a prolapse of the third degree a vaginal hysterectomy was done under spinal anesthesia. The patient made a good postoperative recovery. There was little shock and no postoperative discomforts. About two weeks after the operation patient began to complain of some shortness of breath and dyspnea when talking. This kept up for several days and gave us considerable apprehension, because we had a keen appreciation of the narrow margin of resistance present. Without any aggravation of these symptoms the patient suddenly died in the night twenty days after operation.

The tragic end of this patient is a good example of an occurrence which happens not infrequently after operation. Patients seem to have enough strength to carry them through the operation and are well on to convalescence. Perhaps when allowed to get out of bed for the first time there is a sudden dilatation or giving way of the cardiac musculature, and death suddenly ensues.

#### CONCLUSIONS.

A keen appreciation of this subject will enable one to make a more accurate calculation of how much stress a given patient will stand without fatal results. In elective surgery it will lead to delay in cases where prolonged rest in bed or other suitable measures are necessary to bring the resistance of the patient to a point where operation may be undertaken with the least possible risk. It will compel one to select the form of anesthetic which throws the least amount of work on the heart muscle and the one which lessens shock and postoperative stress, for in many instances it holds the balance of power.

1018 WESTINGHOUSE BUILDING.

## THE USE OF RADIUM IN GYNECOLOGICAL DISEASES.

BY

HAROLD BAILEY, M. D., F. A. C. S.,

New York City.

THE enthusiastic assertions of pioneers in the use of a new therapeutic agent often preclude the possibility of a correct estimation of its value. In the consideration of radium and the radioactive bodies we should be especially careful not to accept off-hand those statements which do not agree with our knowledge both actual and theoretical of the growth and retrogression of tumors.

The public, lay and medical, has already been aroused to the expectation of a cure-all for cancer and other new-growths, and this has undoubtedly led to the exploitation of the radium and Röntgen ray treatment. This is hardly to be wondered at when it is recalled that the study of radioactivity has led to the discovery of over a score of new elements; entirely new conceptions in the fundamentals of physics and chemistry; the knowledge of the transmutation of substances constantly occurring in nature and also to a better understanding of the physics of the Röntgen ray.

The trend of recent gynecological literature would lead to the conclusion that radium has a field in the treatment of cancer, fibroids, and the metrorrhagias in the nonpuerperal; not due to malignancy.

## HISTORICAL

The credit for the suggestion and the actual treatment of cancer of the uterus with radium belongs to Robert Abbe(1) of this city. In 1905 he treated a case of cancer of the cervix with radium obtained from Madame Curie, and eight years later he reported this patient as still alive and apparently free from cancer. He treated another case in 1906 and that patient was reported free from the disease after seven years. The majority of the foreign writers on the use of radium in gynecology give Abbe the credit due him but in America the only author who has given him even reference space is Ranschoff of Cincinnati.

In 1906 Oudin and Verchere(2) reported the treatment of the myomatous uterus with radium, and a year later Oudin published a paper on the hemostatic action of radium, thus leading to the use of

it not only in fibroma but also in uterine hemorrhages due to polypoid or thickened endometrium.

Wickham and Degrais(3), who had previously treated many cases of skin disease and epithelioma, in 1908 applied radium to two cases of uterine cancer and in their book, *Radium Therapy*, 1910, pointed out the possibilities of the substance in gynecological work.

To Dominici(4) goes the credit for the use of large doses with filters of lead so that the ultrapenetrating effect of the gamma ray was obtained. This made possible the use of massive doses in deep work. In 1910 Cheron(5), one of his associates, gave the contraindications for the irradiation treatment of fibroids that hold to-day.

The Clinical Congress of Gynecologists at Halle in May, 1913, aroused the English speaking world to the fact that nearly every important clinic on the continent had been using radio or Röntgen therapy in the treatment of cancer and myoma of the uterus for periods of a few months to a year (in a few cases for a longer period). As an outcome of discussion at this Congress Döderlein and Krönig decided not to operate on uterine cancer for a period of years, and Bumm and Schauta likewise decided to restrict their operating in order that the results of the actinotherapy might be determined. The war has to a great extent kept from us the results of the past two years.

#### ACTION OF RADIUM ON THE TISSUES

Rutherford in his scientific and very interesting book, "Radioactive Substances and their Radiations" says (p. 287): "There is at present no definite evidence to indicate that the  $\alpha$ -rays and gamma rays are fundamentally different kinds of radiation. There is every reason to believe that the gamma rays arising from radioactive matter would show identical properties with  $\alpha$ -rays of the same penetrating power."

It is generally conceded that the  $\alpha$ -ray from a high vacuum tube corresponds to weak or poorly penetrating gamma rays from radium or mesothorium. For this reason in most clinics the treatment with radium or mesothorium is in connection with treatment with  $\alpha$ -ray. Mesothorium is measured in strength with radium bromide which is about 50 per cent. radium. Radium emanation corresponds to 100 per cent. pure radium. Of the three classes of rays given off from radium emanation, alpha corresponding to the anode rays of the  $\alpha$ -ray tube, beta corresponding to the cathode rays and gamma corresponding to the  $\gamma$ -rays; only the latter and perhaps the hardest

beta rays are used. Filters of lead, platinum or brass screen off the undesirable radiations. The nature of the filter is of great importance because as the gamma rays pass through the dense metals secondary rays corresponding to beta rays are formed. The secondary rays from lead are said to be particularly penetrating and they cause degeneration in the surrounding tissue.

It is extremely difficult, perhaps impossible, to entirely separate the beta rays from the gamma. It is estimated that about 10 per cent. of the hard beta rays pass through a filter of 2 mm. of lead. Furthermore the gamma rays as they strike the tissues are constantly forming weak beta rays. Wickham and Degrais(6) offer the following suggestion: "Gamma rays act not directly, but by the production of secondary beta rays. We have seen that over their whole course, in proportion as they come in contact with the material penetrated and its various layers they give birth to secondary rays chiefly composed of beta electrons. These electrons, it is true, are very easily absorbed, and would only have a limited sphere of action. But each cell attacked would be acted on by such secondary rays; and in this way, even in the action of gamma rays, the beta elements, of secondary formation, would play a great part indirectly. It is thus that the action exercised by gamma rays on the most superficial layers of the tissue should be regarded. It is easy to see how important a part might be assigned to the beta rays taken collectively, if the action of secondary beta could be added to that of primary beta. We are careful, however, to avoid definite assertions and conclusions. Considering the extreme reserve with which physicists speak of the separation of the rays, the limits of their penetration, and various other characteristics, physicians should guard against a tendency to formulate too definitely therapeutic methods based on the value of certain rays."

If it were possible to entirely eliminate the action of the primary beta and the immediate secondary beta, produced as the gamma rays leave the filter; it is very probable that the late hyalin degenerations leading to fistulæ into the surrounding organs would be averted. As we shall see later the damage done to normal organs and tissues must be taken into consideration when the question arises as to whether or not a case is suitable for radium treatment.

Dominici and Barcat(7) investigated the action of radium from the histological standpoint, on normal and diseased tissue. They found that the connective-tissue cells whether normal or diseased returned to the state of embryonic connective tissue rich in blood-vessels and later arrived at a stage of maturity in which the blood-

vessels shrink or disappear; and the connective tissue bundles are separated by large fibroblasts.

From the gynecological standpoint an important histological examination was conducted by Paul Haendly(8), the assistant in Bumm's clinic. He examined the uterus and ovaries that had been removed after very intensive radiation. Bumm's first report of twelve cases, those which furnished the material for Haendly, states that the mesothorium used amounted to 15,120 milligram-hours, in one case, and besides this large amount there was also given 10,000 Kienböck units of  $\alpha$ -ray, a tremendous dose. The others received less but still very large doses.

After two or three weeks treatment Haendly found that the cancer cells showed a direct effect that he considered elective. The cells were pale and of unequal color, there was a lack of mitotic figures and vacuoles appeared within the cells. Karyolysis of the cells caused the formation of nonnucleated masses of protoplasm with the final complete destruction of the cell body. There was giant-cell formation and many of these large cells had more than one nucleus. The new formed connective tissue was infiltrated by lymphocytes. This tissue became sclerotic and underwent hyalin degeneration. In the indurated tissue there were masses of necrotic cancer cells which could not be differentiated. The blood-vessels showed a sclerosis and hyalin degeneration of the adventitia and a swelling of the media and intima.

In the ovary he found that the primary follicles were completely degenerated and that the blood-vessels showed a hyalin degeneration of their walls.

To compare with these findings we have the report of Wickham(9). He states that there is a short latent period after which the cancer cells undergo a doubling or trebling in size. The cells in many cases become very large and their nuclei are swollen. The chromatin may be dispersed or massed. The cell protoplasm is markedly eosinophilic; and many cell boundaries are lost. The stroma consists of new connective tissue, with many young fibroblasts. There is a polynuclear infiltration and finally a dissolution of the cancer cells by cytolysis or absorption by the phagocytes and the hypoplastic stroma spreads itself between the degenerated masses.

Hansemann's(10) histological examination of radiated cancer tissue substantiates the above findings in every important particular.

It is proper to ask, how deeply into the tissue surrounding the radium applicator does this action extend, and are not the normal cells affected in the same manner as the tumor cells?

The gamma rays from 30 mg. of radium may be observed in an electroscope after passing through a foot of iron and ionization occurs up to 19 cm. of lead and may be measured. It has been found that the gamma rays penetrate according to the density of the substance through which they pass and are governed by the same physical laws as are light rays, that is, their intensity is inversely proportional to the square of the distance. It would take about a gram of radium to produce the same intensity at 9 cm. that 100 mg. would produce at 3 cm. Kelly and Burnham(11) produced a curve to show the variation of intensity for centimeters for the gamma rays. One hundred per cent. at the surface would show 25 per cent. at 4 cm. and 10 per cent. at 8 cm.

It would appear that some of the radiation of the hardest rays extends deeply into the tissue, that even the farthest points in the pelvis receive a slight dose, and if the amount were massive enough, a considerable dose.

The largest amount of radioactive substance that has been used was reported from Bumm's clinic, and fortunately, specimens obtained by operation and others by autopsy were examined by him and his assistant. He found that practically all cancer tissue lying within 3 or  $3\frac{1}{2}$  cm. from the surface was destroyed and beyond that depth the action was very uncertain, and at 5 cm. or more nodes remained practically uninfluenced.

A. von Wassermann(12) studied the effect of filtered rays on excised pieces of live mouse cancer. He found that 55 mg. of mesothorium for one to three hours exposure would result in no inoculation or the development was very slow. When the pieces of tissue were 1 mm. in diameter the rays were very effective but in 3-mm. pieces the effect was less marked. He came to the conclusion that the action was not a destruction of the cells but the loss of the power of reproduction.

Francis Carter Wood and F. Prime, Jr.(13), believing that Wassermann's experiments were unsatisfactory as regards the establishment of the lethal dose of the gamma rays, undertook the examination of the rays on transplanted rat and mouse carcinoma. They found that the lethal dose for the gamma ray difficult to fix, while that of the beta is easily determined. Gamma rays from 83 mg. have not sufficient power to affect tissue at 1 cm. distance under a two hours exposure and they conclude that when pure gamma rays are used the necessary exposure is eight times as long as when the gamma and hard beta rays are both employed. They express also the belief that sublethal exposures slow the growth of the tumor



cells for a time and that still shorter exposures stimulate the cellular activities.

Most clinical observers have accepted as final the dictum: In appropriate doses the destroying effect on cancer cells extends from 3 to 4 cm.

Bumm, Schauta and Doederlein have expressed the belief that radium has an elective effect or selective action on the cancer cells; and strange to say in the same papers Bumm and Schauta report injuries to the normal tissues and warn against the larger doses. Martin<sup>(14)</sup> points the reasonableness of the formula of Bergonie and Tribondeau that the cells are more sensitive to rays, (1) the greater their reproductive activity, (2) the more their karyokinetic phase, that is, the more remote they are from the mature state, (3) the less defined their morphology and formation.

Hansemann and Schottlander<sup>(15)</sup> have also shown that the action of the rays is not specific and that the effect on normal tissue is the same as on pathological tissue. It will be remembered also that Dominici examined the result of the rays on normal skin and that his report forms part of our knowledge of the action of the rays.

#### RADIUM IN THE TREATMENT OF UTERINE CANCER.

Bumm<sup>(16)</sup> in 1913 reported his first twelve cases. He used tremendous amounts of mesothorium and x-ray and found that all parts of the cervical cancer that could be reached were destroyed and the surface was clean in a few weeks with or without extensive scar tissue. Two cases were cured of the cancer but died, one from a urinary infection following a bladder necrosis and the other following a necrosis of the pelvic connective tissue. He believed then that lead was the best filter and that very hard rays should be used.

In 1914 he reported the results in 108 cases<sup>(17)</sup>, of these sixty-eight were inoperable and forty were operable. After one-half year ninety-eight showed temporary healing. He warns against using large doses stating that as a rule, he now uses doses of not over 50 or 100 mg. (mesothorium) for six to twelve hours; if 200 mg. are used the time should be only a few hours.

Doederlein<sup>(18)</sup> in 1915 had twelve cases of inoperable cancer of the uterus which were in good health one year after the treatment. Of fifty-two cases showing temporary healing thirty-five were operable when the treatment was begun.

Schauta<sup>(19)</sup> reported in 1913 sixteen cases and as regards local effect stated that there were no unchanged cancer cells and many

times no cancer cells at all. In the treatment of these cases there occurred one bladder and one rectal fistula and two severe hemorrhages. The infiltration of the parametrium in some cases remained stationary. He warns against intensive raying of those cases where the septa between the vagina and the rectum and the vagina and the bladder are involved. Finally Schauta states that care must be taken not to mistake local healing for real recovery which, as he says, cannot be assured for from three to five years.

Krönig(20) (1914) in an American address stated that no case with metastasis had been cured, although in many cases the growth seemed temporarily checked. Where the growth had extended into the parametrium and contiguous glands, in a few instances retrogressions had occurred with no evidence of recurrence up to one year. The majority of this type cannot be cured even by the most intense radiation. The best results were obtained in the cases where there was no cancer beyond the primary focus, that is, early operable cases.

In 1916(21) he reported the results in 209 cases, 12.6 per cent. were alive after three years, 6.3 per cent. after five years, 3.4 per cent. after seven years and none after ten years.

Turning at once to the American statistics we have the report of Kelly and Burnham(22) in 213 cases; 199 of which were inoperable. Of the fourteen operable ten were operated and four were treated with radium, of these four two are living and well after three years and two after one year. Of the 199 cases of inoperable carcinoma 53 were clinically cured, and of these 18 were recurrent cancers. These results would show 26.6 per cent. of the inoperable cases cured or 28 per cent. of all cases treated with radium clinically cured.

The time expired for 56 of the cured cases is as follows: 15 over six months, 29 over one year, 5 over two years, 4 over three years, 3 for over four years.

In their report are several unusual statements; "The histological type is not important. In the cured list are 29 cases of squamous celled, 17 basal celled and 7 adenocarcinoma." "We believe every inoperable cancer of the cervix providing general metastasis is not evident stands a chance of at least 1 in 4 of cure by radium treatment."

"Finally we desire to restate most emphatically that radium can and should be used in these cases without local or general injury to the patient treated."

Schmitz(22) of Chicago is hardly less optimistic. No gynecologist ever made such a sweeping statement as he has concerning cancer. He says: "After about 3000 milligram-hours of radium element had

been given (that is, after about twenty-one to twenty-four days) the bimanual findings became usually normal. In a few cases such a state was not reached until about 6000 milligram-hours had been applied. The uteri which were firmly fixed at the first examination became freely movable and could be plainly outlined. The adnexa were palpable and the crater in the cervix was covered with healthy granulations being protected by a grayish or whitish membrane. The parametria also were free of any indurating bands. In other words, by cautious procedures and careful observation, we established the fact that on an average from 3000 to 4000 milligram-hours of radium element was necessary to attain an apparently objective cure."

It is only fair to say that the paper published by him in August, 1916(24) in *Surgery, Gynecology and Obstetrics* lacks objectionable statements and is a presentation of his work with considerable data concerning each case. Of 62 cases of carcinoma of the uterus, 22 or 35 per cent. were clinically well; 32 or 51 per cent. were dead and 8 or 13 per cent. were unimproved. Of the 35 inoperable cases that were treated 11 were clinically cured. He states: "A clinical cure implies a complete subjective and objective cure of the cancer as far as it can be determined by an exact palpation and a microscopic examination." Of the 12 operable cases 11 were operated and then treated with radium and 7 of the cases were clinically well.

If complete data were given of all of the cases the contribution would be of more value for the reader could form his own judgment of the results.

The only other paper worthy of note in the American literature is that of John G. Clark(25) of Philadelphia. He has treated 69 cases of cervical, vaginal or urethral cancers during the past two years; of these cases 10 have not been traced and 31 have not passed the first six months since the treatment. There remain 28 cases, 13 died during the first year, 15 were alive from periods ranging from six months to twenty-two months. Three patients were alive for periods over one and a half years. In the 69 cases there were local healing in 26. In 5 cases there was rapid extension with the formation of rectovaginal and rectovesical fistulæ.

Clark operates on fundal growths and on cases that would ordinarily be classed as operable. He uses radium on border-line cervical cases and on the frankly inoperable. In those cases where radium has acted beneficially he believes that it is not a wise policy to subject the patient to a radical operation in the hope of improving upon the result.

The report though an early one is a moderate and sensible statement of what he has accomplished.

#### RADIUM IN THE TREATMENT OF FIBROIDS.

From a theoretical standpoint there are three ways by which radium could affect the retrogression of the growth and cause a cessation of some of the symptoms of fibroids of the uterus. (1) By the action on the ovaries. According to Haendly it causes the destruction of the primary follicles. This would lead to a failure of ovulation and a consequent cessation of menstruation and would possibly lead to a retrogression of the growth similar to that which often follows the menopause. (2) By the destruction of the mucous membrane of the uterus through the direct effect of the primary and secondary beta rays. Such a result might lead to cessation of the hemorrhage without affecting the size of the tumor. (3) By the effect of the gamma rays on the blood-vessels leading to an occlusion or partial occlusion of their lumen. With the nourishment diminished some retrogression in size would occur.

Oudin and Verchère as early as 1906 treated fibroma of the uterus with radium and obtained a cessation of the bleeding and some reduction in the size of the tumor and an increase of its mobility. The effect on the size and mobility they attributed to the lessening of the parametritis and the absorption of the inflammatory swelling.

The x-ray treatment of fibroids received a great impetus through the development of the technic by Albers Schönberg. Krönig and Gauss developed even a more intensive treatment and soon reported their results in many cases.

Brettauer, Frank and Stern working together have followed the Freiburg technic and Frank states(23) his belief that x-ray treatment is suitable in about 5 per cent. of fibroids and that uterine fibroids may be slowly reduced by x-ray treatment. As regards the action of x-ray Frank says: "Certain observations showing increase of connective tissue in fibromyomata which were subjected to raying have been interpreted as direct x-ray effects. Quite possibly, however, the fibrosis is an involution effect due to the withdrawal of ovarian stimuli from the tumors, comparable though not identical with the shrinkage of fibroids usually noted at the physiological menopause."

Schauta(27) regards the x-ray effect as that of a bloodless castration and believes that radical extirpation is the safest procedure.

Krönig(28) believes that the action of radium in the treatment of

fibroids is chiefly due to the hemostatic effect and finds that the retrogression from radium is not as great as that from the  $x$ -ray treatment. He suggests that the combined treatment with radium in the vagina and  $x$ -ray externally will probably produce the best results.

Kelly(29) treated thirty-six cases of fibroids with radium and states that the result in every case but one has been the shrinkage or disappearance of the tumor. He had all varieties of tumors from sub-mucous to subperitoneal and found that the pedunculated responded as well as the interstitial. The results were accomplished in periods extending from two months to one and one-half years. In many of the cases the tumor filled the pelvis and extended to or above the umbilicus and after one application of the radium to the abdomen and within the uterus the tumor became intrapelvic, the size of an orange. One case had a tumor extending to the umbilicus and received one application of 816 milligram-hours within the uterus and 3327 milligram-hours on the abdomen. The result was a complete disappearance of the tumor, and then the added note—menstruation normal. One of the conclusions of Kelly's paper was as follows: "It is our belief that with increased experience and improved technic it will be possible to relieve every patient of hemorrhages, and in most instances to do away with the tumor (let us say, roughly speaking in nine cases out of ten) and that without serious discomfort, risk, or confinement to bed for more than one or two days.

It is only necessary to turn to his article on cancer to see this same spirit of prophesy displayed for he said "there is marked reason to believe not only that a large number of inoperable cases are curable, but that the joint use of radium and operation, the one in four cure rate of operation may be raised to three in four." Such remarks are highly interesting from many standpoints but they should not appear in papers of this character.

#### RADIUM IN UTERINE HEMORRHAGE.

From the knowledge we have of the action of radium and from the many reports in the literature there can be no doubt that radium will cause a cessation of bleeding from the uterus. The field of usefulness in this class of cases must be very limited, for if the radium is applied within the uterus, the mucous membrane will be destroyed. In those cases near the menopause that have irregular and profuse hemorrhages, and the condition can be diagnosed as nonmalignant,

a curettage followed by the application of a small amount of radium with only a metal filter will probably result in a complete cessation of the bleeding.

In other cases of bleeding of the types enumerated by Frank—adolescent hemorrhages, functional menorrhagia and metrorrhagia during sexual maturity—the treatment should be by the  $x$ -rays because a graduated effect, hardly possible with radium, may be produced and after a time the menstruation may be reestablished.

#### SUMMARY.

*Operable Cancers of the Cervix.*—Histological proof is at hand that carcinoma cells may be destroyed by radium; also that this action even after tremendous doses of radioactive substances does not extend much if any more than 3 cm. into the tissue. If this were the whole story no one could doubt that the proper treatment of the beginning cancers of the cervical lip would be radiation, but in order to apply an amount of radium sufficient to insure the destruction of the cells, in such a case, severe radiation of normal parts must occur and the resultant damage cannot be looked upon lightly. Stricture of the rectum and rectovaginal and vesicovaginal fistulæ have been reported too many times (and there are probably many cases that have not been reported) from our leading clinics for us to accept offhand the statement that radium can be used without local or general injury to the patient.

The question arises: could not a moderate dose of the radium be used as a preoperative treatment to destroy or prevent the reproduction of the cancer cells? Bumm, Wertheim, Kelly and a number of others state that the radical operation is made more difficult by the infiltration, hyperemia and sclerosis of the pelvic connective tissue. Whether this induration in the pelvis will prohibit the attempt at removal, time only will decide, so far it has not. It would seem that in this field lies the great future of radium—preoperative treatment.

The knowledge of the pathology and the dissemination through the lymph channels of the cancer cells and the uncertain action with the entire lack of standardization of the radium treatment, of necessity, causes us to uphold the dictum that radical excision must be the treatment for every operable cancer of the cervix.

*Cancer of the Fundus.*—Statistics show a 70 per cent. cure of this disease by operation. Radium could be used as a preoperative measure, for the uterine muscle acts as a filter for the damaging hard

beta and secondary beta rays. The condition within the uterus and in the broad ligaments must be unknown and the cessation of hemorrhage and discharge is no indication that the patient is cured. Here as in the former type of the disease operation must be performed.

*Inoperable Cancer of the Cervix and Borderline Cases.*—Radiation, radium and x-ray have a valuable field. Palliation will occur in many cases and in a few temporary cure. The outlook is good for a number of permanent cures in this group. In recurrent cancer the results have not been encouraging. We must have always before us Kelly and Burnham's 28 per cent., and Schmitz's 35 per cent. of clinical cures in this class and live in the hope that these results may be duplicated. The opinion of Clark that in those cases in the inoperable class which respond to the treatment, it is better to leave well enough alone and not attempt to operate later, seems well founded.

*Treatment of Fibroids.*—In a paper on the operative treatment of fibromyomatous uterine tumors John B. Deaver(30) says: "A patient treated by radium even though symptomatically improved, still has her fibroid, for I do not take seriously the claim that such tumors disappear under the influence of radiations. Also is it not time for the profession to take a stand and condemn the excessive zeal of those who would displace operation or relegate it to a last resort, and instead put radium in its proper place as a symptomatic treatment to be employed only when operation is contraindicated."

Most operators will find that the indications outlined by Frank for the x-ray treatment of fibroids will also apply to the use of radium. Cases with serious heart, lung or renal disease or those who refuse operation providing the tumor is uncomplicated and not too great a size, might be selected for the ray treatment.

#### CONCLUSIONS.

Radium has a place in gynecological treatment and it will undoubtedly fill a much larger field when the technic becomes standardized. If scientific advancement is to be expected enthusiastic reports must hereafter be accompanied by a complete history of the physical findings together with the histo-pathological report and all the detail of the technic.

Prophecies are out of place, facts are wanted.

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## CHOLESTEROL IN THE BLOOD OF MOTHER AND FETUS: A PRELIMINARY NOTE.

BY

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VARIOUS clinical manifestations indicate that a storage of fat takes place during the latter part of pregnancy, and one interpretation of this phenomenon is that the mother holds fat in reserve for the fetus. Not uncommonly, mothers who are themselves inclined toward obesity give birth to very fat infants. For these reasons, perhaps, physicians have been reluctant to believe that the placental partition effectually checks the interchange of fats between the circulations it separates, although in 1877 Ahlfeld's observations clearly gave the hint that this was true. From that time, whether maternal fat reached the fetus, has been a disputed question. However, the stronger tendency has always been toward an affirmative answer, and many investigators have sought a mechanism to explain fat-transportation through the placenta. Recently, hypotheses elaborated for that purpose were readily accepted and freely advocated in obstetrical literature, while Mendel and Daniels' demonstration of the fact that maternal fat stained with Sudan III does not reach the fetus was overlooked.

Furthermore, quantitative determinations of the fat in the blood of mother and fetus yield widely different values. At the conclusion of labor, we find that the total amount of fat and fat-like bodies varies between 600 and 1200 mg. per 100 c.c. of maternal blood; the fetal variations are within much narrower limits, generally from 500 to 700 mg., with a majority of the cases approaching the lower figure. In no instance are analytical results obtained indicating an attempt at equilibrium between the fat-contents of the two circulations, as would be expected\* if transportation took place. Here, then, we have evidence from the clinical application of methods for blood analysis which sustains the earlier conclusions, based upon

\* The nonprotein nitrogen, amino-acids, urea, creatinin and glucose present values in maternal and fetal blood which indicate that the concentration of these substances in both circulations is approximately the same.

feeding experiments, that fat is not transported through the placenta.

Besides true fats which, of course, are composed of glycerine and fatty acids, other substances closely related to the fats are utilized in the animal economy. They are called lipoids, and one of them, cholesterol, is evidently of great physiological importance; it is an essential constituent of every cell. In chemical structure cholesterol bears some analogy to glycerine and, like glycerine, forms compounds with the fatty acids; these are designated cholesterol-esters. The blood of animals contains both cholesterol and cholesterol-esters and the methods for estimating them have been modified for clinical use. It is doubtful, at present, whether any one of the methods announced yields absolute values, but several are reliable for the purpose of contrasting one sample of blood with another.

The method we employed was that devised by Bloor; it possesses the advantage of permitting a determination of both free cholesterol and cholesterol-esters in a small sample of blood, namely 3 c.c. The total cholesterol in normal women generally varies between 200 and 250 mg. per 100 c.c. of blood; approximately half of this total is free cholesterol and half is cholesterol-esters. However, this proportion is not strictly maintained, even in health.

That the cholesterol-content of the blood during the period of pregnancy presents characteristic variations is a fact established by previous investigations which we can confirm. In the early months essentially normal values obtain, but the blood cholesterol increases notably during the latter half of gestation. Chauffard, Laroche and Grigaut found that the hypercholesterolemia begins about the fourth month and becomes progressively greater as full term is approached. The cause of the increase has been thought to be an increased production of cholesterol on the part of the mother and with this in mind many of the maternal organs have been analyzed both microscopically and chemically. Attempts to demonstrate that the placenta is the source of cholesterol have met with failure. And the evidence that the adrenal glands or the corpus luteum play the rôle in question is far from convincing, though both evidently have an intimate connection with lipid metabolism.

The fetus has never been supposed to be more than an indirect cause of the hypercholesterolemia of pregnancy. Neither has any one suggested that cholesterol passed from one circulation to the other, for its physical-chemical properties place cholesterol in the group of colloids which are not diffusible substances. But on these grounds the question cannot be settled. Results we have obtained

MILLIGRAMS OF CHOLESTEROL PER 100 C.C. OF WHOLE BLOOD.  
Normal Cases.

No.	Name	Para	Cholesterol			Anesthetic	Remarks
			Total	Esters	Free		
1	Mother Fetus	III	275 160	110 0	165 160	None	Normal labor. Normal infant.
2	Mother Fetus	III	210 130	85 0	125 130	None	Normal labor. Normal infant.
3	Mother Fetus	IV	215 115	110 0	105 115	None	Normal labor. Normal infant.
4	Mother Fetus	V	310 225	85 0	225 225	None	Normal labor. Normal infant.
5	Mother Fetus	X	330 125	210 0	120 125	None	Normal labor. Normal infant.
6	Mother Fetus	I	210 120	90 0	120 120	Chloroform	Normal labor. Normal infant.
7	Mother Fetus	I	250 165	165 0	85 165	Chloroform	Normal labor. Normal infant.
8	Mother Fetus	III	210 125	... ...	... ...	Chloroform	Normal labor. Normal infant.
9	Mother Fetus	V	200 140	90 0	110 140	Chloroform	Normal labor. Normal infant.
10	Mother Fetus	IX	380 225	... ...	... ...	Chloroform	Prolonged labor: 46 hours. Normal infant.

## Operative Labor.

11	Mother Fetus	I	250 190	140 0	110 190	Ether	Low forceps. Normal infant.
12	Mother Fetus	I	340 180	... ...	... ...	Ether	Low forceps. Normal infant.
13	Mother Fetus	I	210 170	125 70	85 100	Ether	Low forceps. Normal infant.
14	Mother Fetus	I	210 110	115 0	95 110	Ether	Low forceps. Normal infant.
15	Mother Fetus	II	275 160	145 0	130 160	Ether	Low forceps. Normal infant.
16	Mother Fetus	VI	250 115	140 0	110 115	Ether	Low forceps. Normal infant.
17	Mother Fetus	I	250 110	125 0	125 110	Ether	Breech extraction. Normal infant.
18	Mother Fetus	I	305 110	110 0	195 110	Chloroform	Breech extraction. Normal infant.

MILLIGRAMS OF CHOLESTEROL PER 100 C.C. OF WHOLE BLOOD.—  
*Continued.*

## Miscellaneous.

No.	Name	Para	Cholesterol			Anesthetic	Remarks
			Total	Esters	Free		
19	Mother Fetus	II	275 190	50 0	225 190	Chloroform	<i>Syphilis.</i> 8th month. Infant died shortly after birth.
20	Mother Mother Fetus	I	295 250 140	250 165 90	45 85 50	Nitrous ox.	<i>Decompensated heart lesion.</i> Term. Conclusion of Cesarean section. Normal infant.
21	Mother Fetus	I	330 225	115 0	215 225	Ether	<i>Eclampsia</i> (four convulsions). Normal infant. Term.
22	Mother Mother Mother	II	215 250 155	105 115 95	110 135 60	None	<i>Nephritis.</i> B. P. 250. 4th month. A week later: Therapeutic abortion. 8th day postpartum.
23	Mother	IV	200	100	100	None	<i>Nephritis.</i> B. P. 150. At term.
24	Mother	I	190	95	95	None	<i>Autointoxication.</i> B. P. 180. No albumin. Diagnosis obscure.
25	Mother	I	190	85	105	None	Threatened abortion. 2d month.
26	Mother	I	225	100	125	None	Pernicious vomiting. 2d month.
27	Mother	I	215	125	90	None	Pernicious vomiting. 2d month.
28	Mother	I	240	155	85	None	Alimentary glycosuria. 8th month.
29	Mother	I	275	145	130	None	Albuminuria. B. P. 130. 9th month.

indicate that cholesterol is transported through the placenta, and, possibly the fetus is at least one of the direct causes for an increase in the cholesterol of the mother's blood. In all probability it is more than a coincidence that the hypercholesterolemia begins about the fourth to the fifth month of gestation, the time when the fat metabolism of the fetus becomes active, if we may infer so much from the fact that the deposition of fat in its subcutaneous tissues is first observed at that period.

At the end of labor in five cases delivered without anesthesia the total cholesterol of the mother's blood varied between 210 and 310 mg. The distribution between free cholesterol and cholesterol-esters followed no definite rule but generally there was slightly more cholesterol in the free form. Although the physiological significance of the two forms is unknown, it is noteworthy that the esters are largely, if not exclusively, confined to the blood plasma.

In fetal blood we found, as Huffman also has found, that the total cholesterol (115-225 mg.) was much less than in maternal blood. Moreover, when the delivery was conducted without the use of an anesthetic we found no cholesterol-esters in fetal blood or, if present, the quantity was so minute we could not estimate it. Only in exceptional cases have we observed measurable amounts of the esters in the fetal specimen, namely, once in a case delivered by forceps under ether anesthesia and again in a case of broken cardiac compensation where Cesarean section was performed under nitrous oxide anesthesia. The observations of previous investigators (Klinkert) indicating that cholesterol-esters are normal constituents of fetal blood may have been made upon cases delivered under anesthesia; and certainly the analyses of Herrmann and Neumann may not be accepted as conclusive, for they were made upon a composite sample of blood.

When cholesterol-esters are absent from the blood of the fetus the cholesterol is exclusively in the free form. And, furthermore, in these cases the free cholesterol of both maternal and fetal blood are identical. This relationship is frequently disturbed by the employment of anesthesia and, perhaps, also in other ways. Why such a disturbance in equilibrium does not invariably follow the use of ether and chloroform, we do not know; but it seems likely that the duration and the depth of anesthesia are determining factors.

The absence of cholesterol-esters from fetal blood in normal cases indicates that they may not pass the placenta; and, on the other hand, identical values for the free form in mother and fetus indicate that cholesterol itself passes readily. Indeed, the quantities of free cholesterol in the two circulations are so nearly alike as to give no hint regarding the direction of its transportation. It would be helpful to learn what this direction is, not only because of its relation to obstetrical problems but also on account of its bearing upon the unsolved question as to whether cholesterol is a food or waste product. At present the weight of evidence is favorable to the view that it is a waste product, and in that event we should expect the transportation to be from fetus to mother. If this be true, it will simplify the explanation of the hypercholesterolemia of pregnant women. And it will also account for the excessive amounts of cholesterol in the bile during gestation—a fact demonstrated by McNee and accepted by Aschoff in support of his cholesterol diathesis theory to account for the frequency of gall-stones in women who have borne children.

What the means are by which cholesterol passes through the pla-

centa must be left an open question. Since it is a colloid, evidently, the laws of diffusion will not account for its transportation. In view of the part played by the bile salts in keeping cholesterol in solution, it is natural to suspect that the inorganic constituents of the placenta play a similar rôle. And again the observation of Loeb that calcium sulphate increases the permeability of the lipid membrane of certain fish eggs suggests that the calcium salts at the periphery of the chorionic villi may be connected with the mechanism for the transportation of cholesterol through the placental partition.

The relationship between the autointoxications of pregnancy and lipid metabolism has already attracted attention. In 1912 Autenreith and Funk showed that the blood cholesterol is increased in cases of eclampsia. However, this phenomenon cannot possibly be thought the cause of the disease, for higher values for cholesterol may be observed in apparently normal pregnancy than in cases of eclampsia. For example the total cholesterol was 380 mg. in a patient without any of the preeclamptic symptoms (Case X) and 330 mg. in another who had four convulsions (Case XXI).

It is noteworthy, however, that cholesterol determinations may prove valuable for differentiating eclampsia from nephritic toxemia. Generally, in eclampsia the total cholesterol of the blood is increased but in cases of autointoxication for which the kidneys alone seem to be responsible the cholesterol is normal or diminished. Moreover, we have failed to find an increase in cholesterol in cases of pernicious vomiting of pregnancy, though our experience has been limited to two patients.

In the course of this investigation a number of questions have suggested themselves, some of which cannot be answered through the use of the methods here employed, but other questions surely will be settled as our observations extend. At this time the significant results are: (1) In normal cases delivered without anesthesia the difference between the total cholesterol of maternal and fetal blood is accounted for by the quantity of cholesterol-esters in the former. (2) The quantity of free cholesterol is the same in both circulations. (3) The placental partition is permeable for free cholesterol and impermeable for cholesterol-esters. (4) Practical application of blood-cholesterol estimations is made in the clinical examination of cases of autointoxication.

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## THE SIMULTANEOUS OCCURRENCE OF CARCINOMA AND SARCOMA IN THE UTERUS.\*

BY

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(With nine illustrations.)

THE occurrence of multiple malignant tumors in any part of the body is always an interesting phenomenon, which may give rise to difficulties of diagnosis and puzzling questions of etiology. Leaving aside entirely the embryonal, or so-called "mixed tumors," such as the teratomata and certain parotid and renal growths, we find but comparatively seldom a true combination of different types of malignant neoplasms—particularly of the two most common ones, car-

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cinoma and sarcoma. In view of the great frequency with which these tumors afflict the human race, it would seem rational to expect numerous instances of their simultaneous occurrence in the same individual, or even in the same organ or region of the body. Yet such is not the case. This is particularly true with regard to the uterus, one of the most frequent seats of carcinoma in the entire body, and an organ in which sarcoma, although less common, can hardly be considered a rarity.

Notwithstanding the fact that some of the older writers denied the possibility of the combined occurrence of these two tumors in the uterus, sufficient apparently well-authenticated cases are on record in the more recent literature to demonstrate beyond a doubt that such a condition does at times occur. Leaving out of consideration two early and apparently somewhat dubious cases, reported by Rabl-Rückhard (1872) and Rosenstein (1883), I have been able to collect twenty-seven, to which I wish to add two personal observations.

**CASE I.**—Mrs. R. K., aged seventy-three years. *Clinical Diagnosis:* fibroid tumor of the uterus. *Operation* (Dr. John G. Clark): supravaginal hysterectomy; bilateral salpingo-oophorectomy. *Specimen:* The uterus measures  $9 \times 7 \times 8$  cm.; the external surface is in part covered by adhesions. The most striking feature noted upon external examination is the presence on the fundus, just anterior to the intertubal line, of a mushroom-shaped mass about 4 cm. in diameter projecting somewhat above the general surface. This mass is soft and somewhat hemorrhagic in places; at its lower edge is a small, ragged opening, through which a probe can be passed into its necrotic interior. Upon opening the uterus through the posterior wall the cavity is found to be greatly distended by a submucous growth about 7.5 cm. in diameter projecting into it. This growth, apparently taking its origin from the anterior wall, is extremely soft and mushy in consistency, the lower portion being almost completely necrotic, and presenting a foul-smelling, greenish-black sloughing surface. On cutting away the posterior uterine wall somewhat, the soft, friable tumor tissue is seen to penetrate it completely, forming a continuous band connecting the large submucous growth with the small excrescence noted externally (Fig. 1). The gross characteristics stamp the tumor as without doubt malignant, the general appearance suggesting sarcoma rather than carcinoma. The adnexa show merely senile atrophy, with a small serous cystoma in the right ovary.

*Microscopically*, sections from the uterine wall proper show normal endometrium and myometrium, with no suggestion of tumor formation or malignancy. Sections from the submucous mass, however, present marked variations in different areas. Throughout possibly its major portion the tumor appears composed of a very loose stroma



tissue, containing numerous thin-walled blood-vessels and large numbers of deeply staining cells. These latter present a very high degree of polymorphism, varying enormously in size and contour,



FIG. 1.—Uterus opened through posterior wall showing soft, partly necrotic submucous tumor which at one point has grown through the uterine wall and appears as a mushroom-like projection on the external surface.

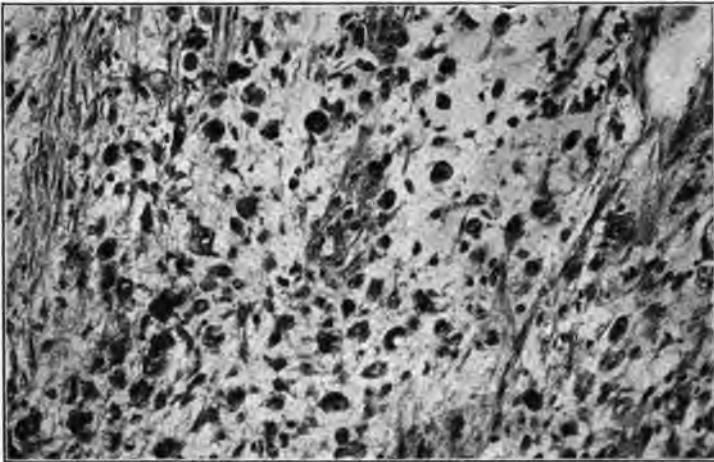


FIG. 2.—Case I. Section from the sarcoma, showing very loose stroma and great irregularity of the cells.

though for the most part a roughly spherical shape predominates, with a minority of spindle forms. Many of these cells are quite small—no larger than the ordinary fixed connective-tissue cells—but others are many times the size of these, with giant nuclei and

comparatively little protoplasm. Between these extremes are many intermediate forms. In these areas the picture is characteristically that of a mixed-cell sarcoma with very loose stroma, and apparently of a high degree of malignancy (Fig. 2). In other areas the general tissue structure is more compact; here fibrous elements are more in evidence, and the cells lie somewhat closer together; the same variations in cell-form are seen, however, and the picture is equally characteristic of sarcoma (Fig. 3). The situation and general appearance of the tumor suggest that very probably it represents a sarcomatous degeneration of a submucous myoma.

Quite a prominent feature of many fields is the presence of good-sized vessels showing a marked tendency to proliferation of the lining endothelium, suggesting at first sight the possibility of an endotheliomatous element in the tumor, but more careful examination of

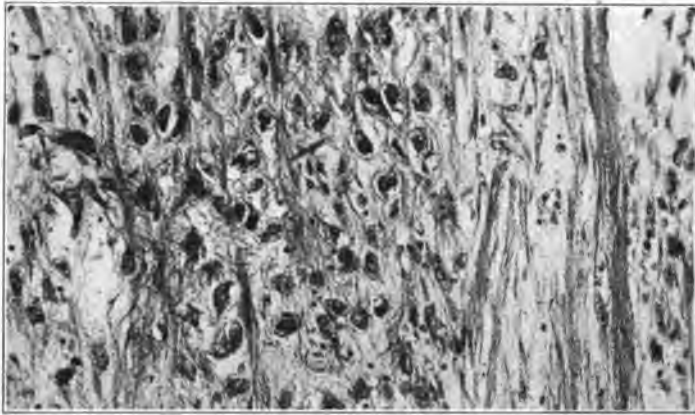


FIG. 3.—Case I. Section from another area of the sarcoma, showing more fibrous stroma, but same variations in cell types.

numerous sections failed to furnish any definite evidence of a participation of the endothelium in the malignant process, and it seems probable that the increase in the lining cells of these vessels represents merely a response to the irritation of the rapidly proliferating tumor tissue surrounding them.

Sections taken from other portions of the tumor, especially the periphery and near the lower pole, present totally different histologic pictures. In many areas very numerous atypical gland formations are seen, composed of single or multiple layers of deeply staining cells, which in places show such extensive proliferation that practically solid plugs are formed; for the most part, however, more or less evidence of a lumen is preserved. These acinar formations are extensively invading the underlying stroma tissue, the whole presenting the typical picture of an advanced adenocarcinoma arising from the endometrium (Fig. 4). For the most part the stroma in the carcinomatous areas is merely fibrous tissue, not sarcoma, but

in some areas the epithelial plugs are directly invading a stroma as typically sarcomatous as that described above; in other words, we have here a true combination of both carcinoma and sarcoma, not only in the same organ, but in one tumor mass (Fig. 5).

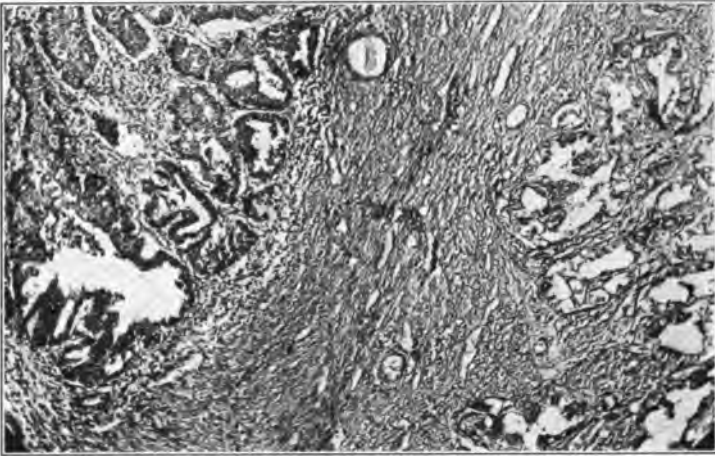


FIG. 4.—Case I. Section from the edge of the tumor, showing typical adenocarcinoma. The stroma here is not sarcomatous.

**CASE II.**—Mrs. M. B., aged forty-eight years. *History:* Irregular menstruation and intermenstrual spotting for several months.



FIG. 5.—Section from an area showing carcinomatous glands invading the sarcomatous stroma.

*Clinical Diagnosis:* Menopause. *Operation* (Dr. Clark): Diagnostic curettage. *Specimen:* Curetings. These show for the most part

scraps of tissue consisting of innumerable, totally atypical glandular formations, lined by columnar epithelium heaped up into many layers, actively invading and destroying the intervening fibrous



FIG. 6.—Case II. Curettings, showing typical adenocarcinoma.

stroma, and presenting the characteristic picture of an adenocarcinoma (Fig. 6). Although the carcinoma where present is fully

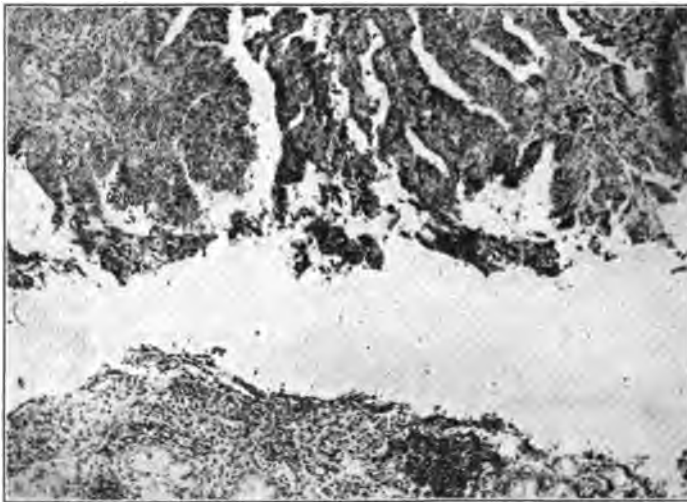


FIG. 7.—Case II. Curettings showing carcinoma above and normal endometrium below.

developed, presenting pictures that remove all possibility of doubt as to the diagnosis, the fact is evident from the curetings that only a portion of the endometrium has become involved, for mixed

among the carcinomatous scraps are other bits of tissue showing normal endometrium (Fig. 7).

Upon these findings, a report of adenocarcinoma corporis uteri was submitted, and at a second operation the uterus was removed, with the adnexa. *Specimen:* The uterus measures  $8 \times 8 \times 5$  cm. The external surface is smooth; on section, the cavity appears normal, but the endometrium has been in part removed. In the extreme fundus, in the region of the left cornu, is a small, somewhat irregular area, rather shaggy and congested in appearance. In the posterior wall is an intramural nodule, spherical in shape, and about 2 cm. in diameter, presenting the gross appearance of a myoma.

*Microscopically*, a section through the shaggy area near the fundus shows on the endometrial surface a distinct depression in the uterine tissue measuring about 8 mm. in depth by 6 mm. in width, filled by a mass of fibrin, leukocytes, blood cells and necrotic material. This evidently represents the area from which the major portion of the tissue previously submitted was removed by the curet. Surrounding it is myometrium showing some round-cell infiltration, and a small scrap of endometrium near one edge of the section, all that remains in this area. The glands of this show the characteristics of the premenstrual stage, but do not show any malignancy. As sections from other portions of the uterine walls likewise failed to show carcinoma, the entire endometrial surface of the uterus was cut into blocks and sectioned for microscopic study. In all sections the endometrium, where present, shows the tortuous, papillary glands characteristic of the premenstrual stage, but no definite malignancy, although in places the glands are exceedingly numerous, lying very close together, and show considerable tendency to dip down into the underlying myometrium. In view, therefore, of the absolutely definite areas of carcinoma in the curetings, with, however, scraps of normal endometrium as well, and of the failure to find definite carcinoma in the extirpated uterus after thorough search, this case must apparently be placed among those in which a small, localized carcinoma, limited to the endometrium, has been entirely removed by the curet. That such cases occur has been repeatedly demonstrated; in a recent paper covering this subject very thoroughly Ladinski has reported twenty-two instances of this condition, three of these being personal observations, and the rest collected from numerous reports in the literature.

An exceedingly interesting condition in addition to the above is presented by the case under discussion, however, in the small intramural nodule mentioned above. This, although grossly appearing firm, and suggesting an ordinary myoma, shows on histologic examination numerous areas in which most intense cellular irregularities are found. In these areas the nuclei and cells are enormously enlarged, many giant cells and giant nuclei lying close together, the whole presenting a picture that can be interpreted in no other way than as a definite sarcoma (Fig. 8). In other areas, the appearance is that of a typical myoma. The line of demarcation between the two types of tissue varies somewhat in sharpness, but is for the most

part fairly distinct, the greatly enlarged, irregular cells of the sarcoma being in marked contrast to the small, regularly arranged cells of the myoma (Fig. 9). The sarcoma appears to be confined en-

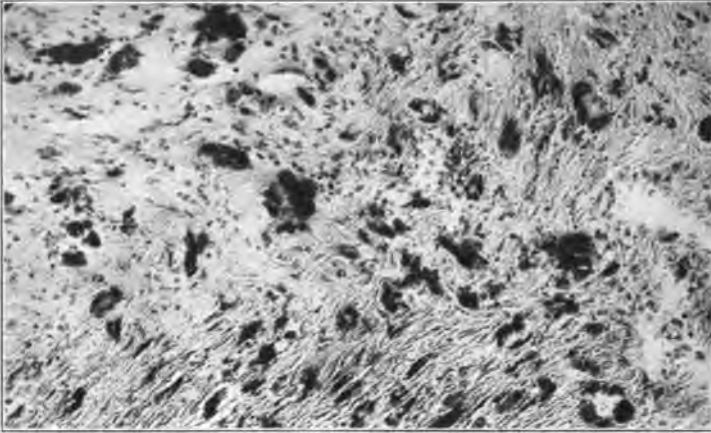


FIG. 8.—Case II. Section from sarcomatous area of the intramural tumor showing great polymorphism of cells.

tirely to the small nodule, not having as yet invaded the myometrium. The endometrial carcinoma and the sarcoma do not at any point come into juxtaposition.

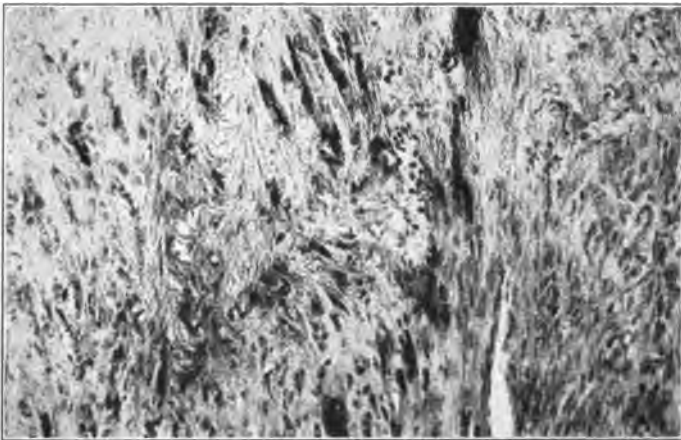


FIG. 9.—Case II. Section from edge of sarcomatous area showing myoma tissue to right and sarcoma to left.

Various theories have been propounded to account for the phenomena here observed, the most plausible being as follows:

1. The carcinoma is primary, and the stroma becomes secondarily sarcomatous as a result of chronic irritation of the connective tissue by the developing carcinoma. Adherents of this theory point to the well-known fact that in experimental tumor transplantation in mice, a growth which started as carcinoma apparently changes at times into a histologic sarcoma after several generations.

2. The sarcoma is primary, the carcinoma arising as a result of undue proliferation of the epithelium, secondary to the irritation furnished by the growing sarcoma.

3. Both tumors arise as a result of cell proliferation instigated by some unknown common stimulus, connective tissues reacting by the production of sarcoma, epithelium by the production of carcinoma.

4. The two tumors arise entirely independently, simply happening by chance to involve the same organ at the same time.

Of the above theories, it can easily be seen that 1 and 2 would be applicable only to those cases in which both types of tumor tissue are intimately associated throughout in *one structure*; they would not explain the condition found in Case II, described above, and in at least twelve of those collected from the literature, in which the two types of tissue were completely separate, coming nowhere into direct contact with each other.

It would seem, therefore, that one of the last two theories, either of which would account for the occurrence of the two types of tumor entirely separate or in varying degrees of combination, would find the widest application. If it were true, however, that both tumors are to be considered the result of a reaction of their respective mother-tissues to some common stimulus, it would seem that the occurrence of such combination tumors should be very common, whereas we know them to be exceedingly rare. Moreover, if we are to conceive of tumors of various natures arising in different tissues as a result of the individual reaction of those tissues to a general systemic stimulus, it would seem that multicentric origin of malignant neoplasms should be exceedingly common, whereas the most authoritative teaching to-day is that, with the exception perhaps of some skin cancers, the vast majority of malignant growths are unicentric in origin.

While it must be admitted that a general systemic *predisposition* to malignancy must be considered as perhaps an important factor in tumor production, I firmly believe that the weight of evidence to-day is in favor of the importance of some local cause as well in the production at any given point of malignant cell proliferation. If this be true, it must naturally follow that the fourth theory

mentioned above, that of mere coincidence, most readily explains most cases of the simultaneous occurrence of sarcoma and carcinoma in one individual, and in a single organ, such as the uterus. This theory would also account for the occurrence among the reported cases of all possible relations between the two tumors; thus in two(3, 7) the sarcoma was in the corpus and the carcinoma in the cervix; in one(11) this condition was reversed, the carcinoma being in the fundus and the sarcoma in the cervix; in seven(1, 5, 8, 14, 16, 17, and Case II of this report) both tumors were in the corpus, but in different areas; in four(4, 15, 22, 27) the two tumors approached almost to actual contact, but yet remained distinct; in three(18, 21, 26) they were for the most part distinct, but showed at some few points a commingling, whereas in the remainder, including Case I of this report, a more or less intimate mixture of the two tissues existed throughout considerable areas. It is, of course, possible that in individual instances the irritation of one tumor may have been a factor in the production of the other. Thus in Case I, described above, it seems entirely probable that the carcinoma has arisen in the endometrium covering the submucous tumor in consequence of the irritation of that tumor; and in one other instance(27) the author suggests that a similar factor may have been responsible for a carcinomatous change in the endometrium of one uterine wall which was impinged upon by a submucous myoma with areas of sarcoma, situated in the opposite wall. The same condition is seen, however, in conjunction with benign submucous myomata, so that it does not seem reasonable to ascribe to the sarcoma *per se* any specific rôle in the production of the carcinoma even in these instances.

The question must then naturally arise, whether "carcinosarcoma" of the uterus is to be considered a true pathologic entity, *i.e.*, a condition deserving an individual classification, apart from carcinoma or sarcoma. Personally, I do not believe such to be the case. Some authors have attempted to lay great stress on the distinction between cases in which areas of carcinoma and sarcoma exist separately and those in which they are combined into one tumor, reserving the term carcinosarcoma for the latter only. Thus, Stein, for example, considers cases of "nebeneinander" much commoner than of "ineinander" occurrence of carcinoma and sarcoma in the uterus. A study of the collected cases, however, tends not only to throw doubt on the accuracy of this statement, but it also demonstrates clearly in my opinion that so many transition stages exist between complete dissociation and complete amalgamation of the



two types of tissue that the latter condition must be considered just as much due to fortuitous circumstances, in the majority of cases, as the former. It would seem, therefore, that while we may perhaps logically apply the term carcinosarcoma to those cases in which there is a single tumor containing both elements, such tumors are not deserving of classification as individual entities, since they have probably arisen merely from the chance growing-together of two types of malignant tissue that have originated independently.

That the occurrence of these two tumors in combination in the uterus must be exceedingly unusual is shown not only by the comparatively few cases on record, but also by the fact that only two previous writers have been able to report more than one case. Forssner has seen two, and Franqué three, but one of his is identical with that reported by Klein. In this connection, a curious error has crept into the recent excellent work on gynecological pathology by Frankl. In a short section devoted to "Carcinosarcoma Uteri," Frankl makes the statement that "Hertel found carcinoma of the cervix eight times in twenty-nine cases of uterine sarcoma." Reference to Hertel's original article shows that this deals with the malignant degenerations occurring in over 1100 myoma cases. Among these he found twenty-nine specimens which showed malignancy in the *body* of the uterus, viz., sixteen cases of adenocarcinoma arising from the endometrium, and thirteen of sarcomatous change in myomas; "quite distinct from these, *carcinoma cervicis* was found as an accompanying condition eight times in the 1100 myoma patients." There was not a single case of combined carcinoma and sarcoma in the entire series.

So far as can be judged from the reported cases, combined carcinoma and sarcoma of the uterus tends to occur rather late in life; thus of the twenty-seven collected from the literature, none fall within the first three decades, only one in the latter part of the fourth, four in the fifth, twelve in the sixth, and seven in the seventh. In three cases the age of the patient is not given. The first case reported in the present paper, occurring in the eighth decade, represents therefore apparently the most advanced age at which this condition has been observed.

With regard to the clinical aspect of combined carcinoma and sarcoma, the condition is of course highly malignant, though probably not more so than carcinoma or sarcoma alone. An interesting point in this connection is that in nearly all cases metastases and recurrences show merely sarcoma, this apparently being the predominant, or at least the more malignant type of tissue; in one

instance, however, a carcinoma of the ovary was found at autopsy one year after the removal of a carcinosarcoma of the uterus. In one extremely interesting case, reported by Kubinyi, both types of tissue caused metastases, but in them were completely dissociated, pure carcinoma being found in numerous soft tissues, and pure sarcoma in the spinal column. In this instance, the carcinoma and sarcoma had been intimately associated in the primary uterine growth.

The following cases have been reported during the past twenty-five years, the data in each instance being presented in the briefest possible form:

1. Klein (1890). Aged fifty-nine years; pedunculated tumor projecting through cervix, removed manually, leaving a thin shell of uterine wall. Rapid recurrence and death. Tumor micr., a round-cell sarcoma; in a small bit of uterine wall were glands with markedly proliferating epithelium, suggesting carcinoma.

2. Amann (1892). Aged fifty-seven years; polypoid tumor projecting through the cervix. Removed, and recurred twice; death about one year after second operation. Tumor micr., a colloid carcinoma, with sarcomatous appearance of the stroma.

3. Montgomery (1893). Age not given; very early carcinoma of the cervix, with a round-cell sarcoma in anterior wall of corpus. Patient well three and a half years after hysterectomy.

4. Emanuel (1896). Aged forty-seven years; polypoid tumor of fundus, micr., a round-cell sarcoma, with diffuse adenocarcinoma of the uterine mucosa. The sarcoma was surrounded by a narrow zone of normal, noncarcinomatous endometrium, which covered also its basal portion. A few normal endometrial glands, but no carcinoma, in the sarcoma.

5. Niebergall (1896). Aged sixty-two years; curetings showed carcinoma. Two days later a tumor the size of a goose egg was spontaneously extruded from the cervix, but remained attached by a narrow pedicle. Removed manually; micr., a spindle-cell sarcoma. Patient well six months later.

6. Iwanoff (1898). Aged thirty-eight years. Several incomplete attempts made at removal of a vaginal tumor followed by extensive recurrence; death after six years. Tumor micr., adenocarcinoma of uterus. At autopsy a large mass found filling vaginal vault; micr. very complex in structure—in places sarcoma, in others carcinoma, in others adenomyoma. Extensive metastases in lungs, pleura, and peritoneum, all pure sarcoma.

7. Franqué (1899). Aged fifty-three years; primary sarcoma of wall of corpus, associated with beginning adenocarcinoma of cervix.

8. Franqué (1899). Aged fifty years; typical papillary adenocarcinoma of lower portion of corpus and cervix, with round-cell sarcoma of fundus. (A third case mentioned by Franqué is the one reported by Klein.)

9. Gebhard (1899). Age not given; stroma of endometrium transformed into a sarcoma with numerous giant cells; in midst of this sarcomatous tissue many carcinomatous glands.

10. Fraenkel (1901). Aged fifty-eight years; several myomata, and in corpus an adenocarcinoma whose stroma showed unmistakable signs of sarcomatous change. Death one year after panhysterectomy; at autopsy, carcinoma of left ovary.

11. Ritter (1902). Age not given; in fundus a carcinoma, in cervix a small round-cell sarcoma. Metastasis of sarcoma in liver.

12. Opitz (1903). Aged fifty-seven years; curetings showed typical adenocarcinoma in places, sarcoma in others. Hysterectomy performed; in fundus a polypoid sarcoma containing carcinomatous glands, with an area of carcinomatous endometrium distinct from this tumor. Remainder of endometrium normal.

13. Nebesky (1904). Aged fifty-seven years; polypoid mass the size of a plum growing from posterior uterine wall; micr., a large spindle-cell and giant-cell sarcoma, containing numerous irregular, carcinomatous glands. Lining of entire corpus also carcinoma, stopping abruptly at internal os. Associated with carcinoma of left breast.

14. Spencer (1905). Aged forty-four years. Uterus enlarged; contained two distinct growths. One, shaggy and friable, deeply infiltrating the uterine wall and penetrating the peritoneum—micr., a typical adenocarcinoma. The other, occupying one cornu, multilobular, smooth white surface—micr., a round-cell sarcoma. Recurrence in two months after vaginal hysterectomy; no autopsy. (Report of Pathological Committee of the London Obstetrical Society: three members considered both growths "spheroidal-cell carcinoma"; four thought the one composed of small cells might be a sarcoma.)

15. Schaller (1906). Aged sixty-six years; curetings showed a combination of adenocarcinoma and giant-cell sarcoma. Panhysterectomy performed; multiple myomata, a small polypoid growth, and a crater-like excavation in left tubal angle found. Sections from the last-named region showed adenocarcinoma with superficial degeneration; the polypoid tumor was micr. a spindle-cell and giant-cell sarcoma, with superficial areas of carcinoma, evidently penetrating from without.

16. Schmorl (1906). Aged sixty-two years. Uterus enlarged, contained multiple myomata and an adenocarcinoma arising from the posterior wall, also a small polyp projecting into the uterine cavity. Latter micr., a large round-cell sarcoma, with occasional giant cells. No contact between the two tumors, but one of the myomas contained a metastasis of the carcinoma.

17. Sehrt (1906). Aged fifty-three years; uterus greatly enlarged and distorted, the cavity filled with necrotic masses, and the walls largely replaced by friable tumor tissue. Several small, well-defined whitish plaques on free portions of uterine walls. Micr., main tumor a mixed-cell sarcoma; little plaques areas of typical adenocarcinoma. No mixing of the two types of tissue.

18. Meyer (1908). Aged sixty-two years; small myoma in anterior

uterine wall and polyp in fundus. Micr., latter a spindle-cell and mixed-cell sarcoma. The endometrium was carcinomatous; at the base of the polyp the sarcoma and carcinoma came into direct contact.

19. Albrecht (1909). Aged sixty-six years; died from peritonitis. At autopsy uterus found completely inverted and almost entirely transformed into a soft, friable tumor mass, with mere traces of the original uterine muscle in center. Micr., areas of pure round-cell and spindle-cell sarcoma, others of adenocarcinoma mixed with sarcoma. Metastases in one ovary.

20. Forssner I (1909). Aged sixty-seven years; corpus uteri a flabby sac filled with necrotic masses growing from walls, into which they penetrated somewhat. Micr., a small round-cell sarcoma of the endometrium, scattered throughout which were areas of malignant adenoma (adenocarcinoma). In a few months inoperable recurrence of pure sarcoma.

21. Forssner II (1909). Aged fifty-eight years; small tumor projecting into uterine cavity. Micr., a giant-cell sarcoma, surrounded by a ring of adenocarcinoma. For the most part the two tissues intermingled, but at one point were apparently separated by a narrow strip of normal endometrium.

22. Jones (1911). Aged fifty-six years; extensive adenocarcinoma of cervix and lower portion of corpus, with sarcoma in latter. The two tumors were everywhere distinct, although coming into very close apposition.

23. Kubinyi (1912). Aged sixty-two years; submucous myoma in fundus, and a pedunculated nodule the size of an orange in lower part of uterine cavity. Micr., latter a "carcinosarcoma deeply invading the musculature." Death two years after operation. At autopsy, metastases found in pelvic glands, sacrum, vertebræ, liver, adrenals, lungs. Micr., all metastases in soft tissues pure carcinoma, those in sacrum and vertebræ pure sarcoma.

24. Stein (1912). Aged forty-six years; supravaginal hysterectomy. Uterus enlarged, with several masses projecting into cavity at fundus. Micr., a mixed-cell polypoid sarcoma of the endometrium, intimately mixed with adenocarcinomatous proliferation and metaplasia of the cylindrical epithelium of the glands into squamous epithelium. Removal of cervical stump advised, but refused. Hopeless recurrence in one year; at a palliative operation several pounds of friable tumor tissue removed; micr., a mixed-cell sarcoma.

25. Benthin (1914). Aged fifty-six years; curetings showed areas of squamous carcinoma, adenocarcinoma, and sarcoma. Hysterectomy performed; in the uterus a mixture of same types of tissue found as in the curetings.

26. Thaler (1915). Aged fifty-four years; uterine walls occupied by a soft tumor mass projecting into the cavity, which latter was filled with necrotic material. Micr., a round-cell and spindle-cell sarcoma. The endometrium showed carcinomatous degeneration, with deep invasion of the uterine walls. In places the tumors were separate, but in others there were nests of carcinoma in the midst of sarcoma tissue.

27. Pool (1916). Aged fifty-seven years; uterus enlarged to size of a grape-fruit by a large submucous, degenerated tumor, histologically a fibroid containing areas of sarcoma. In addition to this, an area of adenocarcinoma on the opposite side of the uterus, apparently having developed as a result of prolonged irritation of the endometrium at the point where the fibroid mass pressed upon it.

Additional reports by Riederer and Ballin have been inaccessible, and data concerning their cases cannot therefore be given. The cases reported by Rabl-Rückhard (1872) and Rosenstein (1883) have not been considered, because of the imperfect development of histologic pathology at the time of their study.

#### SUMMARY.

Two cases of combined carcinoma and sarcoma of the uterus are reported. The first occurred in a woman seventy-three years of age. The uterus was enlarged, owing to the presence of a partly necrotic submucous tumor, which consisted of sarcomatous and carcinomatous elements, and had apparently arisen by sarcomatous degeneration of a submucous myoma, with carcinomatous degeneration of the overlying endometrium. The second patient was forty-eight years of age. There was a small but definite area of adenocarcinoma in the fundus, removed by curettage. On examination of the uterus after subsequent hysterectomy the site of the small area of carcinoma was clearly distinguishable, but no further carcinoma could be found. A small intramural nodule, lying in the posterior uterine wall, was found histologically to be a myoma with areas of definite sarcoma.

In a series of twenty-seven cases of combined uterine carcinoma and sarcoma collected from the literature, cases of complete separation of the two types of tissue, as in Case II above; of their intimate commingling, as in Case I; and of all possible intermediate conditions are to be found. It seems, therefore, that even when the two tissues exist intermingled in one tumor mass they have probably arisen separately and subsequently grown together, so that "carcinosarcoma" can hardly be considered a distinct pathologic entity. The condition is rather rare, and occurs, as a rule, fairly late in life. In malignancy it is comparable to carcinoma or sarcoma alone, but metastases and recurrences usually show only sarcoma.

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## HYDATIDIFORM MOLE AND CHORIONEPITHELIOMA.

### ANATOMICAL VARIATIONS, RELATIONS, CLINICAL SIGNIFICANCE.\*

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(With twenty-three illustrations.)

In spite of the numerous valuable contributions of recent years to the subjects of hydatidiform mole and malignant chorionepithelioma, there are still many points which remain to be explained or confirmed, with the exception of the exact knowledge we have gained about the nature and the origin of the elements involved in these conditions.

Setting aside the difficult task of determining the causes capable of changing the coördinate physiological activity of the ectodermal elements into an incoördinate and unrestricted invasion of the maternal structures, a question still confused with the obscurity which covers the etiology of malignant tumors in general, we will devote particular attention to the anatomical relations between hydatidiform mole and chorionepithelioma, and to the anatomical variations of both, considering them particularly from the viewpoint of their clinical significance.

The most important researches of late have all been directed to establishing, on the basis of anatomical findings, the positive differentiation between a distinct chorionic neoplasm, and a simple benign proliferation or invasion of the maternal structures by chorionic elements, which distinction is absolutely necessary for a correct prognosis and proper treatment. Above all other considerations it is necessary to have a correct diagnosis in this case, because, of all

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malignant tumors, chorionepithelioma offers the most striking type of rapidity of growth, local destructiveness, and capacity to reach distant organs through the blood-vessels. Besides, the doubt cast upon the genuineness of the cases reported cured after a radical operation, and still more upon those reported cured after a more or less conservative operation, demonstrates how urgently we need exact criteria for a correct diagnosis.

Among the researches made to accomplish this task, we need mention the contributions of R. Meyer of Germany; Durante, Nathan Larrier, Brindeau and Curtiss of France; Poso and Pestalozza of Italy, and the work of Ewing in this country.

Subsequent researches should be directed along the lines suggested by the above authors, and should determine:

(a) The special characters pointing to malignant tendencies of the chorionic proliferation, considered *per se*: whether it be a part of a hydatidiform mole or placental remains of recent or old standing (placental polypi). Pathological findings from material, collected by curettage, or expelled from the uterus.

(b) The differential characters of the various chorionic invasions of the maternal structures; hydatidiform mole, normal benign invasion incident to pregnancy, chorionepithelioma. Pathological findings of uteri removed through operation, or postmortem, and of the different metastases in the various organs.

(c) Revision and control of the classification of chorionepithelioma given by Marchand. The study of the significance of the various forms on the basis of more ample statistics would aid greatly in explaining many apparent contradictions, resulting from the different indefinite terms applied to the tumor.

(d) Approximate determination, from the differences in the various anatomical forms, and the reactions of invaded structures, of the probable clinical course and termination of the disease.

According to this plan, all subsequent cases should be fully reported, with a complete account of the histological features, in order to avoid the criticism given to the fragmentary reports of some of the cases included in the preceding statistics.

With this object in view, I have studied carefully the histology in four cases of chorionepithelioma previously recorded, and in two additional, which occurred in my practice in the last few months, besides other material kindly put at my disposal by the Pathological Department of Cornell University. Of these, I will give only a very condensed description at the end, after giving a complete review of all the questions covering the whole subject up-to-date.



## EMBRYOLOGICAL DATA NECESSARY TO APPRECIATE THE SUBJECT IN ITS DETAILS.

To grasp exactly the significance of the pathological activities of the chorionic epithelium, we need only to compare them to the phenomena taking place in the physiological chorion at the stage of the embedding of the ovum.

It is through the classical work of von Spee, Peters, and Leopold, and, most recently, through the investigations of Teacher and Bryce, to whom we are indebted for the description of the early chorion in the youngest ovum yet secured, that we have definitely gained the knowledge of the process occurring at the stage of embedding, even before the attachment of the ovum. To the old conception of the formation of the decidual chamber out of a circumvallation of the uterine mucosa, we have substituted the real essence of the process, consisting in an actual destruction of the endometrium by the activity of the proliferating trophoblast.

Teacher and Bryce particularly emphasize the fact that the degeneration and necrosis of that zone of the endometrium, in immediate contact with the blastocyst, the breaking up of the vessels and glands, as a result of the chorionic invasion, are much the same as the changes occurring in the walls of the blood-vessel, invaded by a chorionic embolus in chorionepithelioma.

The special features of the chorionic proliferation at the stage of the embedding can be summarized as follows, after Teacher and Bryce:

The trophoblast, surrounding the blastocyst, is made up of a double layer; a thin inner one of Langhans' cells, and an external thicker formation of syncytium. The latter, which is the chief characteristic feature at this time, forms an extensive, almost continuous wall surrounding the ovum, and is made up of masses or bands, which, extending toward the decidual chamber, concur by eccentric pressure, but more by direct destructive action to enlarge it.

These masses and bands, dotted with irregularly assembled nuclei, small, flat, and dark stained, show a more or less diffuse vacuolation, giving to the whole a distinct spongy or reticulated appearance. The occurrence of these vacuoles at the time of the greatest activity of the syncytium, the presence of free uncoagulated blood in many of them, lead to the reasonable conclusion that they are the expression of a physiologic process intended to establish a temporary circulatory system for the primitive trophic changes in the ovum.

In rapid succession, the Langhans' cells, while at first limited to the

inner layer, with a very active mitotic multiplication penetrate and break their way through the plasmodial space. These cells play an important rôle in the process of attachment, coming in contact with the underlying submucosa modified into decidua, paving the way for the attachment of the villi, and displaying a power of invasion. Although they are often connected by syncytial strands, it is not unusual to find them independent in the decidua, especially around the vessels.

Their most conspicuous activity in proliferation, however, ends when the decidua has attained sufficient power of holding the invasion in check. The absence of such power can be easily measured from what takes place in tubal pregnancy, in which the chorionic invasion continues unrestricted because of insufficient decidual formation.

In the stage of attachment in normal uterine pregnancy, with the villus gradually evolving and establishing the most complex and perfected medium of ovulomaternal connections, the young chorionic epithelium, as a conspicuous reticulum of vacuolated plasmodium, and independent cytotrophoblastic columns, its rapidly superseded, and mostly confined to form with syncytium only the covering of the villi. Although in the successive stages of placentation, the intermingling of fetal and maternal elements still goes on, and the giant cells (commonly regarded as a syncytial derivative) up to the end of pregnancy, continue to invade the underlying decidua, on the whole the invasion is moderate. The fibrin, interposed between the fetal and maternal elements whenever they come in contact, is interpreted as a result of the reaction of the maternal structures against the fetal invasion.

The proper deductions to be made from the study of the development of the human ovum are: (a) That if a decided power of invasion is attributed to the primitive trophoblast we are in fact encountering biologic activities specific of the malignant tumors, transplanted to definite but temporary elements of a physiological process. (b) If, on the other hand, chorionic malignant tumors possess the identical morphology of the early trophoblast it is only reasonable to assume that this should be considered as a standard for any pathological proliferation of the chorion if we want to determine the real factor linking hydatidiform mole with chorionepithelioma.

HYDATIDIFORM MOLE, ANATOMICAL VARIATIONS AND RELATIONS  
WITH CHORIONEPITHELIOMA.

The starting point of many observers has been to find a possible anatomical interdependence of the two conditions, to substantiate the generally accepted fact that, clinically, the greatest percentage of cases of chorionepithelioma malignum have been found to succeed to a hydatidiform mole. The greatest attention has, therefore, been exercised to determine:

(1) Is there, generally speaking, anything specifically common between the histological structure of the hydatidiform mole and that of chorionepithelioma malignum?

(2) Is it possible to determine whether there are any particular histological features in some individual cases of hydatidiform mole, which could enable the pathologist to assume that any such case would undergo a chorionepitheliomatous degeneration?

(3) Are the reported cases of destructive mole transitional forms between simple hydatidiform mole and chorionepithelioma, or are they specifically different?

(4) Is the simple superficial invasion of the maternal tissues by the common hydatidiform mole, and the deeper invasion of the destructive mole apt to be misleading, and result in an incorrect diagnosis of chorionepithelioma?

## HISTOLOGICAL STRUCTURE OF HYDATIDIFORM MOLE.

By the classical studies of Marchand, the anatomical constitution of hydatidiform mole was fundamentally established. If we must recognize that the pathogenesis is doubtful, and that there is still a difference of opinion as to whether hydatidiform mole is a primary disease of the stroma, or of the epithelial covering of the villus, or if the stroma is affected by a mucous degeneration or simple hydropic edema, we know for a fact that both constituents of the villus are participating, but the epithelium actively, with a more or less abundant proliferation, the stroma only with regressive changes.

Durante, who has recently made the most extensive researches on the subject, describes such a condition in the following terms: hydatidiform mole is represented by absence of fetal capillaries in the villus, mucous edema of the villus, resulting in the formation of the vesicle; excessive proliferation of the epithelium, especially of the syncytium, which shows abundant vacuolization (edematous hyperplasia of the syncytium). This proliferation precedes the interstitial edema.

In attempting to obtain intimate knowledge of the process of molar formation, he makes it dependent entirely on a primary disease of the vascular system of the villus. This would consist of a process of endarteritis, only initial in the larger vessels, more marked in the capillaries of the vesicle, finally resulting in a complete obliteration of the vascular lumen. From hypernutrition through the maternal lacunæ, the syncytium would acquire an excessive stimulus to overgrowth and hyperplasia, and the pouring of fluid into the connective tissue core would be the result of the accumulation of the products intended for the fetus.

This original interpretation, striking at the pathogenesis of the condition, although resulting from the careful and complete observations of Durante, should not be accepted as entirely conclusive. At least, I should say it would not be compatible with those cases in which the molar degeneration is coincident with the earliest stages of development of the villus when the vascular system is entirely absent, and this seems to be the rule.

The epithelial proliferation, as the feature common to hydatidiform mole and chorionepithelioma, is worth considering in its various aspects and details.

Generally, in the average specimen of hydatidiform mole, this proliferation develops mainly at the expense of the syncytium. Buds of the syncytium mostly spring from the external epithelial layer of the villus, to which they remain contiguous, and are less frequently arranged as independent strands or masses in the spaces among the villi. Vacuoles are almost always present, giving to the syncytial masses a spongy appearance. With more or less proliferation of the syncytium, the cells of Langhans do not multiply to the same extent. In most of the villi, the internal cellular layer is scarcely discernible; in some, although present it shows a very moderate tendency to develop buds, which extend through the external syncytial layer, or into the surrounding syncytial masses.

Differing from this usual type, variations are found, in which the moderate hyperplasia of the syncytium has given place to the most active proliferation of both syncytial and Langhans' elements. Besides the normal representatives of the chorion, there is often noted in the molar proliferation, the intervention of a third element, constituted by individual large cells, with granular refringent protoplasm and darkly staining nuclei (syncytial derivatives).

These differences at times may be found in the same specimen and are represented in the annexed figures (1, 2, 3).

In certain instances, however, not only the relative proportion of

the various epithelial elements is deranged, with indifferent preponderance of either, but the whole proliferation is of such extent as to displace or almost obliterate the connective-tissue core of the villus. Upon this occurrence is based the opinion of D'Erchia and Sappelli, who attribute the formation of the cystic cavities in the epithelial masses, to a degeneration of the central elements of Langhans. Accordingly, the distinction between an epithelial hydatidiform mole,

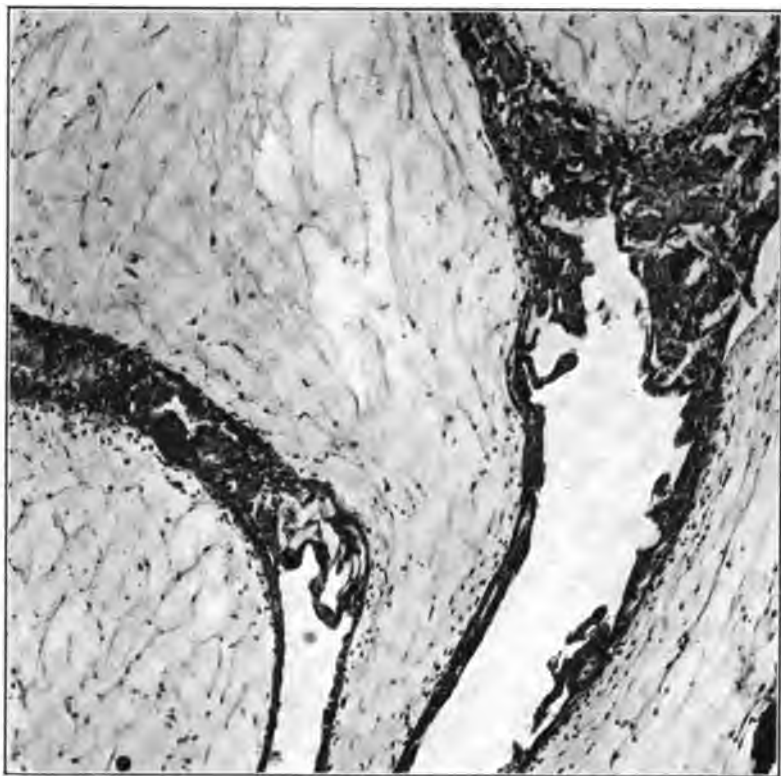


FIG. 1.—Hydatid mole. The epithelial proliferation is exclusively syncytial.

and a connectival one, would depend on the rôle played by the connective-tissue core, which, in some specimens would be entirely missing.

Frassi, has disproved the possibility of such an occurrence. In all the sections made from the specimen of hydatidiform mole at my disposal, I have been unable to find formation of cavities in the groups of Langhans' cells, which could be interpreted as due to necrotic changes of these cells. Although, at times, the vacuoles in the syncytial masses are so wide as to assume the aspect of large

cavities limited by a net of thin protoplasmic strands, the resultant lacunar appearance is absolutely distinct from the cystic cavities, specific of hydatidiform mole, in which it is always possible to recognize the presence of the connective-tissue core of the villus. Its presence indeed is absolutely essential to the correct conception of hydatidiform mole; its absence, instead, could not be interpreted otherwise than as an established degeneration into chorionepithelioma.

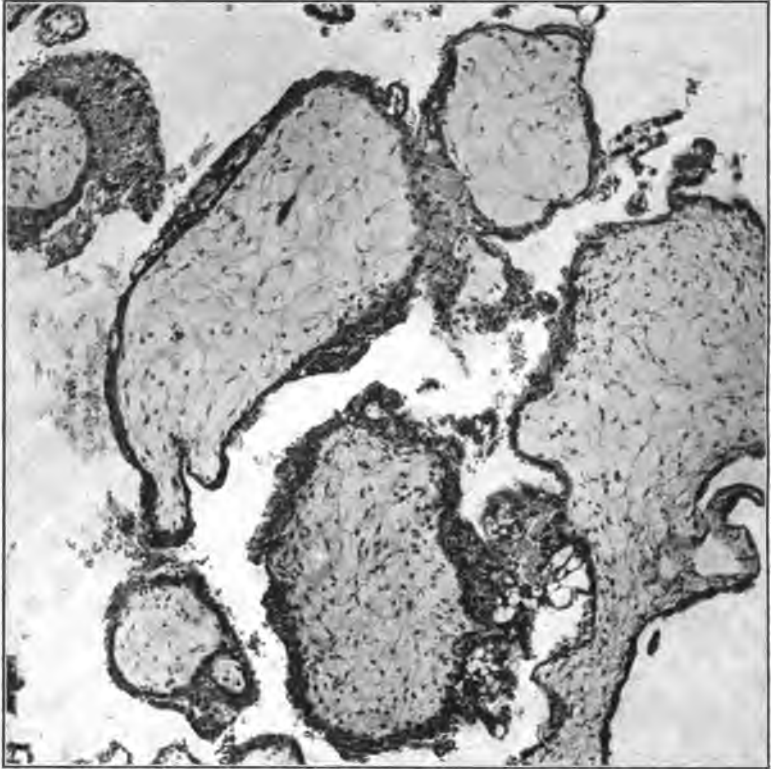


FIG. 2.—Hydatid mole. The epithelial proliferation is rather marked and at the expense of both elements of the chorion.

But, however limited the ectodermal proliferation may appear in some cases of hydatidiform mole, it is always of such extent and character, as to suggest an origin in the earliest stage of chorionic development. This corresponds to the view, that the villi of hydatidiform mole belong to the earliest period of gestation, when the ovum is beginning to attach itself to the site of implantation, and the degeneration indifferently involves chorion frondosum and l ve (Winter).

CHARACTERS OF MALIGNANCY IN THE CONSTITUTION OF HYDATIDIFORM MOLE, INDEPENDENT FROM THE INVASION OF MATERNAL STRUCTURES.

A careful analysis of particular features of the chorion in the different specimens of hydatidiform mole, and various sections of the same mole, and a study of the relations of the chorionic proliferation

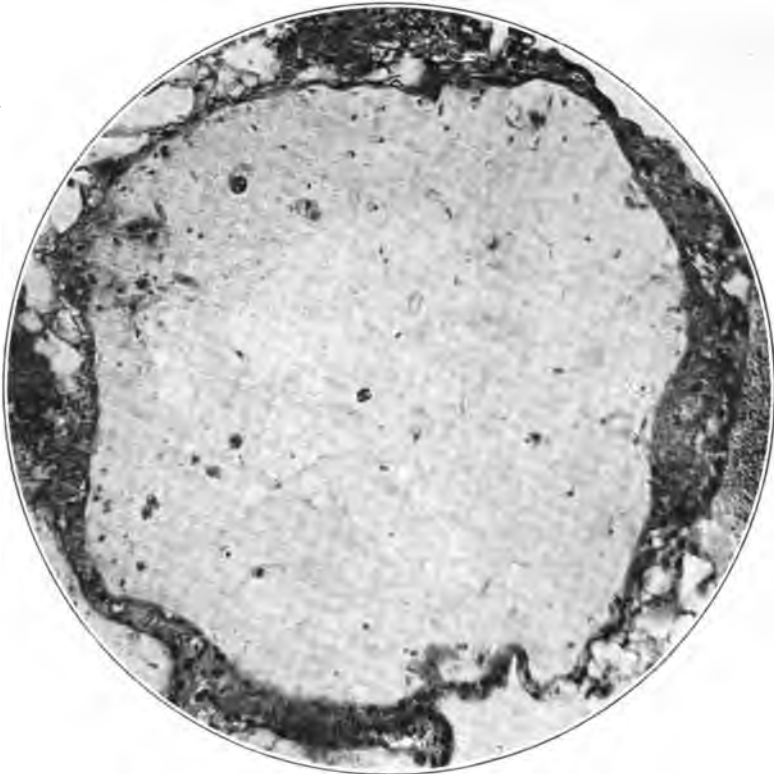


FIG. 3.—Neuman cells, infiltrating the core of a villus in a benign hydatid mole.

to the maternal tissues are indispensable in differentiating the two chorionic proliferations: the one of the mole, the other of the chorionepithelioma.

In this respect we find it convenient to consider rather closely the essential features upon whose presence and significance in the epithelial proliferation of the hydatidiform mole, there is still some difference of opinion, viz., the vacuolation of the syncytium, the rôle played by the cells of Langhans, and the syncytial wandering cells.

Although some authors, as Polano and Frassi for instance, are still inclined to believe with Marchand that the vacuoles in the syncytium of hydatidiform mole are signs of a degenerative process affecting the syncytium, their very presence, as we have said, in the early normal chorion at the time of the most conspicuous activity of the syncytium, seems more apt to support the interpretation given to them of primitive vascular lacunæ.

Accordingly, researches upon hydatidiform mole, instituted by v. Franque, Spuler, Nocchioli and others, have established, from the marked occurrence of vacuoles at the only point where the mole shows the most active proliferation, and the usual presence of uncoagulated blood in some of them, almost beyond doubt, the fact that the vacuoles in the syncytium of hydatidiform mole, as well as in the trophoblast, are acting as vascular lacunæ into which the blood, escaping from the eroded maternal vessels, supplies the necessary nourishment to the surrounding masses of chorionic epithelium.

In regard to the part played by the cellular elements in the proliferation of the hydatidiform mole, Curtiss, in a detailed anatomical study of a specimen of infiltrating hydatidiform mole, compared with all other similar cases reported, strongly points to such a feature as an evidence of benignancy. He draws such a conclusion from the following arguments:

(a) The syncytium, only, is specifically invested with an histological activity, necessary to establish the embedding of the ovum.

(b) The biological cycle of the syncytium is extended outside the limit of the invasion, and up to the end of pregnancy possesses a distinct power of preventing the coagulation of the blood.

(c) The cells of Langhans, instead, possess a very limited biological cycle. This is partly explained by their changing into plasmoidal elements on coming in contact with the extravasated blood, but mainly by their ability to coagulate the surrounding blood, and the degenerative changes consequent from deficient nutrition.

(d) The cells of Langhans, although possessing destructive properties, especially angioclastic, generally have a very limited power of invasion.

(e) In the particular case he has studied, the multiplication of Langhans' cells through direct division, instead of the usual mitotic process, should be considered as an attempt of the cells to grow under improper conditions, and an index of their weak vitality. But following up closely the valuable discussion of Curtiss, covering interdependence, cycles and attributes of the various trophoblastic elements; it seems that in approaching the general problems of



embryology, upon which the last word has not been said, he accepts simply presumptive interpretation of the phenomena as conclusive evidence of established facts.

In fact, although the belief is rather common that the syncytium derives its origin from the fusion of the cells of Langhans, this interpretation is not fully supported by the synchronous presence of both constituents of the trophoblast in early specimens, and by the conspicuous preponderance of the syncytium in the earliest human ovum described by Teacher and Bryce. Only in more advanced phases (ova of Peters and Leopoli) the cellular elements, primarily confined to the inner layer, are actively extending in proliferating columns in the plasmodial spaces. Teacher from his studies on chorion-epithelioma is led to believe that the trophoblast may from the beginning be plasmodial, and the Langhans' cell layer may arise by differentiation within the plasmodium.

Even modifying the interpretation of Teacher, upon the findings of Hubrecht and His, and admitting the synchronism of both elements in the trophoblast, we should consider this as the common matrix, and we could not exclude the indifferent passage of one form to the other, within certain limitations, which are still obscure. We could not otherwise explain the presence of Langhan's cells in tumors arising in connection with advanced stages of pregnancy, or at term, when the cellular elements are supposed to be entirely missing.

As to the cycle of elements, if we make a distinction, as we ought, between the young active vacuolated plasmodium, and the old dormant syncytium, comparing the first with the cells of Langhans, we could not see much difference in their relative period of existence, both showing activity until the embedding and attachment of the ovum are complete.

On the other hand, both young plasmodium and the cells of Langhans being essential features of the embedding and attachment process, in which the invasion and destruction of tissues are concerned, it is not possible to deny to any of them invasive activities.

In later stages, however, those two active formations, having exhausted their primary function, disappear to give place to a relatively inactive syncytium confined almost exclusively to the covering of the villi, whose only attribute of inhibiting the coagulation of the blood in the intervillous spaces expires with the end of pregnancy.

From this state of rest in the old syncytium we can explain the benignancy assigned to the hydatidiform mole, of which the best

example is given in the case described by Sauvage, as we shall see later.

The gradual appearance of syncytial wandering cells in the chorionic proliferation of hydatidiform mole has been interpreted by some authors as signifying a tendency toward a malignant process. Nattan Larrier and Brindeau, for instance, accepting the belief of Letulle and Bonnaire that such cells are the essential characteristic of chorionepithelioma, conclude that these syncytial derivatives point strongly to a close relation between the two conditions, as in both they possess the power of penetrating the mesodermic tissues, and differ in morphological and biological attributes from the homologous syncytial cells of normal placentation.

As for the invasion of the connective tissue-core of the villi, Neumann was the first to direct attention to the following feature. In two out of eight specimens of hydatidiform mole examined, he noted the presence of round or irregular large cells, assuming the eosin stain, with one or more nuclei, invading the stroma. These became malignant. The remaining cases not showing such invasion had a benign course.

This led Neumann to believe in such invasion as an indication of malignancy. This contention has found but little support, and is not regarded as having any bearing on the prognosis.

Discounting simple inclosures of epithelium as a result of tangential sections (to which Findley has called attention), we find that the real, independent, loosely arranged cells of Neumann are commonly found in undisputed benign moles (Ruge, Voight, Pick, Briquel).

On the other hand, moles with malignant characters (Solowit) and in the case reported by Ewing (chorioadenoma), the numerous sections made from the invaded uterine wall failed to show such cells.

Their presence then in the hydatidiform mole seems only to indicate an accessory to the abnormal proliferation of the ectodermal elements, with no particular significance as malignant evolution.

Taking now into consideration all the related facts, we cannot but admit with all other observers, that the histological evidence of hydatidiform mole, taken *per se* and independently from the underlying structures, can only be considered as presumptive, but not pathognomonic of malignant evolution. We shall maintain however, that those moles, which, through a persistence of the primitive chorion (if the molar degeneration begins with the initial stage of pregnancy) or through a reversion to the same type of chorion (if the degeneration starts in the later stages) reproduce quite identi-

cal histological features, possess all the invasive and destructive attributes of the early trophoblast.

In other words, we should attach a very suspicious significance to the overproduction of young syncytium, to the cellular transformation of the same, but above all to the presence of cells of Langhans in active mitosis, and to the marked tendency of the epithelial elements to form masses independent of the core of the villus, reducing this last structure to very limited proportions.

#### HYDATIDIFORM MOLE IN ITS RELATION TO THE MATERNAL STRUCTURES.

It is, however, only the mutual relation of maternal structures and molar formation, and necessarily, in uteri removed with moles maintaining their attachment, that we must look to, in order to get reliable evidence which would enable us to differentiate between benign and malignant conditions.

#### SIMPLE HYDATIDIFORM MOLE NOT INVASIVE.

Although for obvious reasons the opportunity for such anatomical investigation is seldom possible before the disease has attained a decidedly malignant turn, fortunately we possess in two singular instances found in literature (the one described by Findley in 1903 and the more recent one of Sauvage in 1913) the two most striking examples of benign moles, still maintaining their relations with uteri removed in peculiar circumstances, from which we are able to obtain the differential features, and the exact limitations of benignancy. From the detailed anatomical descriptions of the above-named specimens, the connection of the mole at the site of implantation is reduced to simple contact with the underlying decidua, with little or no penetration of the subjacent tissue, from which it is separated by an intermediate fibrin layer. This is more conspicuous in that part of the periphery of the mole, which comes in contact with the decidua vera. The proliferation of the epithelium is scarce and entirely limited to the syncytial elements, without any participation of the cells of Langhans.

In this brief outline we find in fact condensed the ideal type of benign mole, in which with the maintenance of a strict equilibrium of the epithelium to the connective-tissue core of the villus, there is a corresponding decided absence of penetration into the maternal tissues, even less than the penetration of chorion in normal pregnancy (Durante).

Basing the conception of the benignancy of hydatidiform mole upon such limitation, we cannot accept as benign the case described

by Marchand. In this case as Curtiss points out, all the stages of invasion, muscular, perivascular, and endovascular are present. Although a true muscular dissection is missing, it is to be noted that at one particular spot in the serotina, compact and spongy layers have disappeared, and the chorionic elements directly invade the muscle (true ulceration). However distinct from the real invasive type, it can be considered anything but a transitional form.

#### INVASIVE OR DESTRUCTIVE MOLES.

When the molar elements, however, passing sharply the usual line of cleavage and breaking through the decidual barrier, invade the myometrium, going through the various degrees of infiltration, from the microscopical forms to the macroscopical transformation of the uterine wall into a spongy mass similar to a bee's nest, we are encountering problems of pathology of the chorion, regarding which even the defining terms are considered faulty.

The terms, malignant mole or malignant degeneration of hydatidiform mole, for instance, should be discarded, as they include under the same heading two distinct pathological entities (invading mole, and chorionepithelioma) which, although having a common origin and gross features, are entirely distinct in their clinical and anatomical evolution.

Curtiss and Ovi deserve the credit for having made clear the chief differential features of the two conditions, with a revision of twenty-two cases of destructive moles, collected from the literatures and a full description of their own cases.

In destructive hydatidiform mole the essential feature, however active and preponderant the epithelial proliferation may be, is that both constituents, epithelium and connective-tissue core of the villus, or, we might say, the vesicle as a whole takes part in the invasion. The manner in which the invasion proceeds is also essentially distinct and consists of a progressive process of destruction and separation of the different uterine structures, from the mucosa to the muscles, induced by the dipping down of the molar vesicles.

In the case of Ovi and Curtiss, besides those features common to all other cases reported, we find an almost absolute restriction of the invasive properties of the chorionic epithelium.

The study of each focus shows an enclosing musculo-vascular capsule, and a central part consisting of extravasated blood and fibrin, the most peripheral part of which is canalized and invaded by leukocytes. The musculo-vascular stratum surrounding the focus is in-

vaded by plasma cells a true leukocytic limiting wall, more marked where the fibrinous layer is thinner, as the direct contact of the chorionic invasion would excite a more conspicuous reaction.

The chorionic elements are entirely confined to the focus. Although occasional Langhans' cells are seen in the walls of the vessels of this limited area, syncytial elements outside the fibrinous layer are missing, and furthermore not a single vein shows invasion at a distance.

It is upon such strict limitations (*a*) connective-tissue core and epithelium combined to take part in the invasion; (*b*) route of the invasion through direct and progressive destruction in continuity of the uterine structures, that we can figure the real pathognomonic features, and explain the relative benignancy of this decidedly distinct type of destructive mole. This, indeed, closely considered would not possess all the anatomical qualifications of a malignant tumor (invasion, destruction *in loco*, and capacity for metastases). Whenever and wherever these develop, be it in the vessels of the invaded organ or at a distance, it is then and there that the mole ends, and the chorionepithelioma begins.

FACTORS PREVENTING THE PASSAGE FROM THE SIMPLE TO THE INVASIVE FORM OF HYDATIDIFORM MOLE. TRANSITIONAL FORMS, LINKING HYDATIDIFORM MOLE AND CHORIONEPITHELIOMA.

Durante and Paquy, in a recent contribution to the prognosis of hydatidiform mole, placed great emphasis on the presence and extent of local reaction, as natural means of defense against the invasion. In normal pregnancy, they maintain, that the natural wall of resistance is represented by a normal decidua, which is called upon to exaggerate its normal function, through hyperplastic changes or leukocytic infiltration, in the presence of an abnormal growth of the chorionic epithelium in hydatidiform mole.

Subsequent researches have failed to constantly find such reaction, either as hyperplasia, in some cases the decidua being very thin, or with round-cell infiltration, which, when present has been accepted as an expression of inflammatory changes due to infection.

Curtiss accepts the importance of such reaction, but claims that not a simple pericellular infiltration of the surrounding tissues, but as in his case, the peripheral assembling of plasma cells, fibroblasts and polyblasts, would constitute a real cicatricial wall against the invading structures.

Without going as far as Durante and Wallich in ascribing to the

sufficiency or insufficiency of such reaction the cause of benignancy or malignancy, and in recognizing in the breaking of such barrier the origin of chorionepithelioma, we might only accept it as an eventual limitation of the invasion, and possibly interpret it as an accessory factor of regression upon established focuses, as my case of regressing chorionepithelioma indicates.

Otherwise, misinterpreting simple secondary anatomical changes of the invading, or invaded tissues as factors of genetic influence, we might be misled into many other untenable assumptions. For instance, cases of chorionepithelioma, following extrauterine pregnancy, should occur more commonly than they really do, in view of the insufficient decidual reaction in the tube, and the deep chorionic invasion of the muscles and the vessels.

This last feature is common in the tube, and the innocent deportation of villi in normal pregnancy reduces to its real significance the rôle played by the depth of the graft in the genesis of chorionic tumors.

We cannot overestimate the significance of local or general reactive conditions, and accept the same as true determining factors of benignancy or malignancy. These characters in the tumors are in general accepted as distinct phases intimately connected with the anatomical constitution.

It is, however, true that chorionic tumors seem to contradict the rules governing the general biology of tumors in many respects, with reference to the confinement *in loco* and spontaneous regression of even distant foci of invasion. This would credit to a certain extent the contention of Blumreich that, for chorionic tumors histological malignancy does not necessarily imply clinical malignancy.

Pestalozza upon analogous features encountered in the experiments of Fichera in the grafting of embryonic and fetal structures, would consider the pathological proliferation and invasion of the chorion, not as a true tumor, but rather would accept for them the term and anatomical meaning of hyperblastosis suggested by Adami, and would place great reliance on the general resistance and conditions of the blood, to prevent the transition from benign hyperblastosis (hydatidiform mole) to malignant hyperblastosis (chorionepithelioma).

But at present, from the comparative researches instituted into all the collected material, which have enabled authors to coördinate the clinical course with the anatomical structures, we feel more safe in considering those variations, when they are sufficiently clear, to be

the deciding factors in the transition from one form to the other, and in the subsequent evolution.

The most notable feature in this respect, is beyond doubt, the loss of equilibrium between the connective-tissue core, and the epithelial layer of the villus.

Since 1897 Durante, from the fact that the hydatidiform mole is the result of a disease of the villus, in which the relation between mesoderm and epithelial elements is still maintained, and as this peculiarity is characteristic of adenoma, defined hydatidiform mole as an adenoma of the placenta. His further inference was that, when in hydatidiform mole the epithelium, breaking its connection from the sustaining connective-tissue chore, proliferates excessively it is determining a potential malignant transformation of the mole, not dissimilar to what takes place in adenoma, when the epithelium breaking the normal barrier of the connective tissue evolves to carcinoma.

That we are entirely justified in classifying the average hydatidiform mole as a tumor is very doubtful, as the common essential features and evolution are of a degenerative character; but there are cases, of course, in which progress and subsequent evolution establish the same relations which exist between adenoma and carcinoma for hydatidiform mole and chorionepithelioma.

Ewing, in his recent classification of chorionic tumors, from the considerations, that "the villi are glands in every essential respect, both anatomical and physiological," and that "a tumor which reproduces in an orderly manner the structures of a glandular organ is by current definition an adenoma" concludes by applying the term chorioadenoma destruens to that tumor, in which with a distinct anatomical type, there are associated evolution and clinical course greatly at variance with true chorionepithelioma malignum.

The essential anatomical feature is found in the fact, that the invasion and destruction of the maternal structures is carried by the growth of the entire villus. The cells possess a limited capacity for independent growth.

Under this type, distinct for its slow progress, inability to give general metastases, and possibility of regression many of the various reported cases of destructive mole, and destructive placental polypi would be properly classified. In fact, they represent transitional forms which are marked by the relative inability of the epithelium to free itself from the connective chore of the villus and form independent growth.

The limits, however, are not always definite and the passages from one form to the other are rather common.

Liepmann is right in his contention that many cases of reported destructive mole are nothing but actual chorionepithelioma. Probably the case described by Ewing is not absolutely typical. The independent epithelial metastases in the veins of the uterus, far from the original site of the invasion should be considered rather as marking the step toward true chorionepithelioma.

The absolutely essential characteristics of such type are found instead in the cases described by Curtiss and Ovi.

From all these facts, if we can conclude that the persistence of the mesoderm in the chorionic invasion constitutes a reliable index of relative benignancy in the subsequent evolution, which fact is clinically proved beyond any doubt, yet we cannot consider the mesoderm as a real factor limiting the evolution. The chore of the villus seems to play a passive part in subsequent malignant changes, not dissimilar from the part played by the connective tissue surrounding the epithelium of a gland in adenoma, degenerating into carcinoma.

If the differences in the anatomical disposition of connective and epithelial tissues in the gland and in the villus, are partly responsible for a ready appreciation of impending malignant changes in the gland, and our failure to detect similar changes in the chorion, they could not be conceived as displaying opposite physiological influences in the degeneration toward malignancy.

As the breaking of the connective-tissue barrier in adenoma is only secondary to the changes in the epithelium, which assumes embryonic morphological characters and biological activities, we cannot but admit similar physiological processes in the transition from benign to malignant forms of chorionic proliferation, and conclude that the disappearance of the connective-tissue core is only incident, subordinate, and proportionate to the proliferating activities of the epithelium, of which the most suspicious expression is found in all the histographic features of the primitive chorion.

Before Ewing had amply proved the necessity of systematizing, under this group of chorioadenoma, all the forms of transitions originating from placental remains, normal or molar, Poso had raised considerable objection to such interpretation of transitional forms.

From a thorough investigation of all the cases collected in the literature of the first ten years, since chorionepithelioma was established as a pathological entity, Poso arrives at these conclusions:

(1) Destructive mole is entirely different from chorionepithelioma



as the former represents the infiltration of the myometrium from both constituents of the chorion, ectoderm and mesoderm; the latter



FIG. 4.—Chorionadenoma (Ewing). Uterine wall from the cavity almost to the peritoneal surface. At the site of invasion we can easily see that it is made up at the expense of the epithelium and connective-tissue core of the villus. It is in fact the whole villus which seems to enter the patulous sinus. Nearer the peritoneal surface the vessels contain pure epithelium.

instead is a malignant tumor exclusively constituted by the epithelial elements of the chorion.

(2) Destructive mole, through a simple embolic dissemination in

distant organs, as vagina, lungs, etc., could clinically resemble chorionepithelioma, but a careful appreciation of the essential anatomical distinctions above mentioned is sufficient to clear the diagnosis.

(3) As a general rule, the presence of mesoderm in chorionic invasion restricted or unrestricted, *in situ* or in distant parts, is sufficient to exclude the diagnosis of chorionepithelioma. Upon

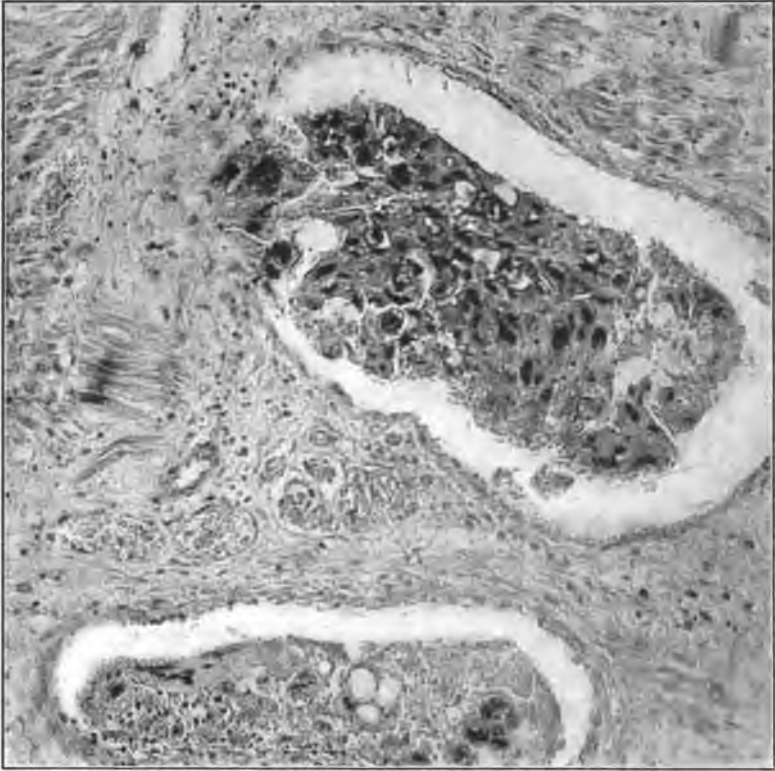


FIG. 5.—Chorionadenoma (Ewing). The epithelium is attaching itself and breaking through the vascular wall. In this we find the evidence of a true metastasis and the actual establishment of chorionepithelioma.

such a contention he would exclude from the statistics of chorionepithelioma all similar cases, minimize the interrelation of chorionepithelioma to hydatidiform mole, and consider as simple molar invasion all cases reported cured after a more or less complete operation.

He deserves great credit, for having supplemented the work started by R. Meyer in advocating the exercise of great care in a

differential diagnosis. But his conclusions, as to the revision of the statistics, are somewhat prejudiced by the preconceived ideas of barring the generally recognized relation between hydatidiform mole and chorionepithelioma, and of deliberately excluding any presumption of a possible cure for an actual case of chorionepithelioma.

The claims that (*a*) it is not often possible to admit a direct derivation from one form from another, as it is not possible to exclude



FIG. 6.—Pregnant uterus at four months, removed for cancer of the cervix. Section made at the site of implantation to show extent of deep chorionic invasion.

an intermediate pregnancy resulting in abortion; that (*b*) no anatomical evidence of transition had yet been produced to his knowledge; that (*c*) simple embolic processes occur commonly in hydatidiform mole, without assuming the rôle of true metastases; that (*d*) the benign course and final recovery of cases in which primary and metastatic foci had shown presence of villi would *per se* be sufficient proof against chorionepithelioma, as this last like cancer, does not

admit degrees of malignancy, but only a fatal outcome, these claims seem to be in the light of previous and subsequent researches open to serious objection and criticism.

Pestalozza, in a very recent work has disposed of these arguments by an extensive discussion, of which the most valuable point is in reference to a clear demonstration of the essential differences,

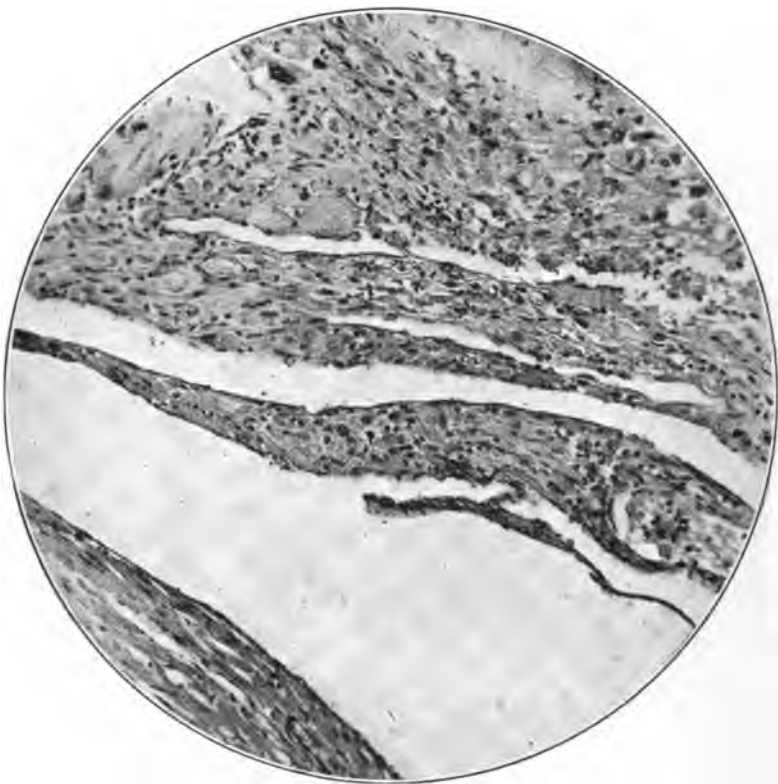


FIG. 7.—Pregnant uterus at fifth month, removed for retention of placenta after abortion complicating multiple fibroids. The deep chorionic invasion is practically absent.

separating simple villous emboli, destined to be absorbed, and true metastases, in which the epithelium, assuming independent activity from the inert mesodermic core, is apt to invade the vascular walls and adjacent structures.

No more conclusive evidence of transition from one form to the other can be found than in the case described by Ewing, as in Figs. 4 and 5. Although the original site of infiltration shows an

intricate texture of ramified villi, some normal, some more or less degenerate, covered by more or less conspicuous masses of epithelium; in parts, far from the main zone of invasion, simple masses of epithelium, syncytial and cellular elements in active proliferation, lodged in veins, actually constitute, with vascular and perivascular invasion, the real essence of chorionic tumors. The uncertain data in regard to etiology, mentioning only an abortion, cannot really



FIG. 8.—Chorionic invasion persisting ten days after the extraction of a simple hydatid mole. Septic uterus from autopsy.

exclude a molar degeneration of the ovum as the villi are mostly degenerating. But, if the death of the patient, immediately following the operation, and the unfortunate absence of the autopsy are indeed responsible for rendering incomplete the conclusions based on the final outcome of this case, it really stands as the most typical case, anatomically described of the transitional forms.

In the flat denial of degrees of malignancy, and in maintaining

that chorionepithelioma, like cancer, could hardly be conceived cured with or without operation, Poso brings forward an absolutely negative argument to support his contention.

The dictum of Marchand, that we cannot talk of absolute malignancy, stands good for chorionepithelioma as for cancer. The various form of uterine and ovarian cancer are striking examples of such variation in prognosis. On the other hand, setting aside the possibility of a spontaneous cure for chorionepithelioma, as far as the reports of cases cured after operations are concerned, we cannot

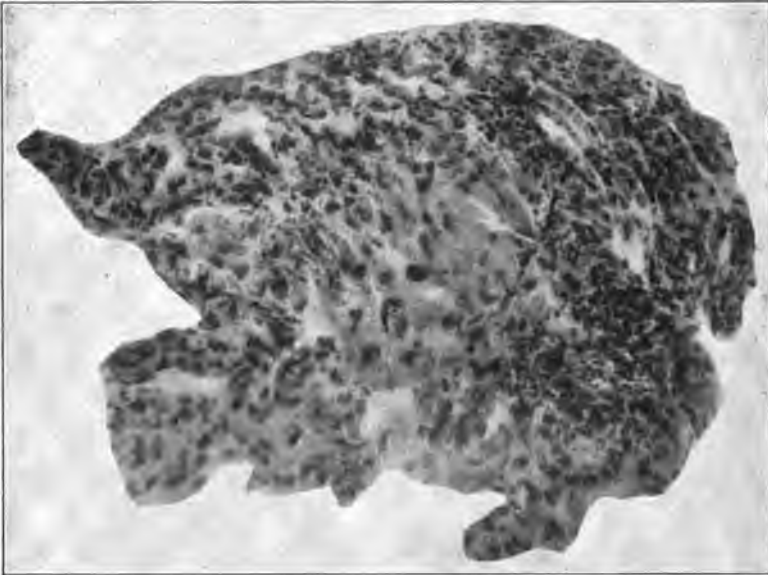


FIG. 9.—Vaginal metastases. Chorionepithelioma. (First case.)

find any sufficient ground for a different conclusion for chorionepithelioma, if the early removal can undoubtedly accomplish the radical cure of cancer.

#### CHORIONEPITHELIOMA.

*Anatomical Classification.*—Its bearing on the prognosis. It seems to me that the original classification of Marchand, in spite of considerable successive objections, has not undergone radical changes. The careful revision of all the accumulated material, in the last three decades, has proved instead that to special histological features

seem invariably and correspondingly related a distinct clinical course and exit.

The distinction of such tumors as typical, atypical and transitional has been found necessary, not only from the anatomical point of view, but for the practical deductions connected therewith.

The first, and most definite, is represented by the faithful reproduction of all the constituents of the primitive chorion, cells of

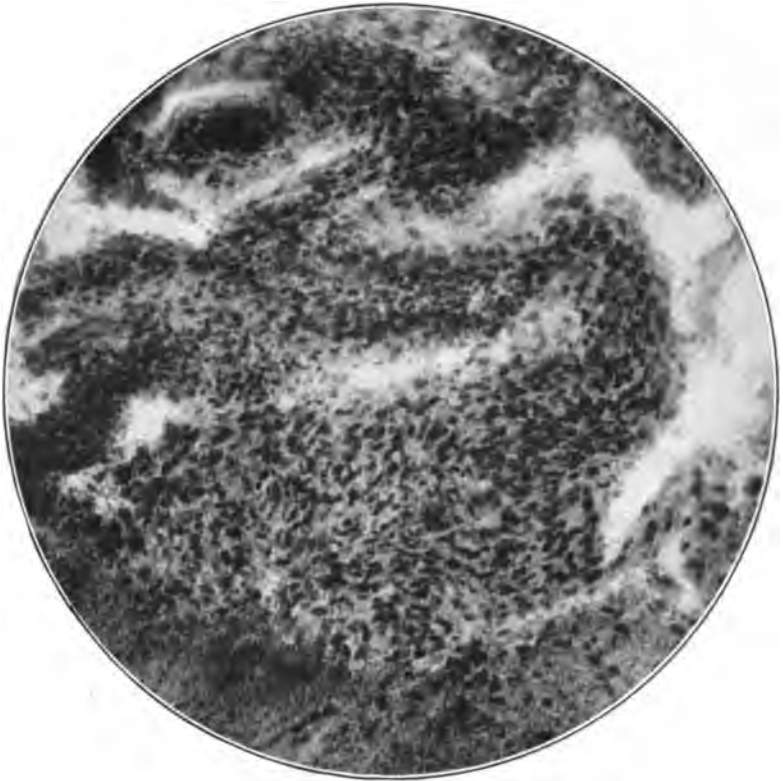


FIG. 10.—Curettings. Syncytioma. (Second case.)

Langhans and vacuolated syncytium, with the peculiar arrangement of masses and ramifications of syncytium, in which meshes are sparsely diffused the cells of Langhans.

The second is represented by an infiltration of the myometrium by derivatives of the syncytium, chorionic wandering cells.

The third consists of syncytium, and syncytial cells, with a very limited proportion, if any at all, of Langhans' cells.

The chief point of controversy has been raised as to the second

type, and even at present we are forced to admit, after the closest investigation of all the available data in reference to such type, that its anatomical and clinical bearings are not so definite as to assign to it the full recognition of a distinct variety of malignant chorionic tumor.

In normal pregnancy for the first six months (Meyer) and up to the end, and even weeks after (Kworotansky-Pinto), not only the

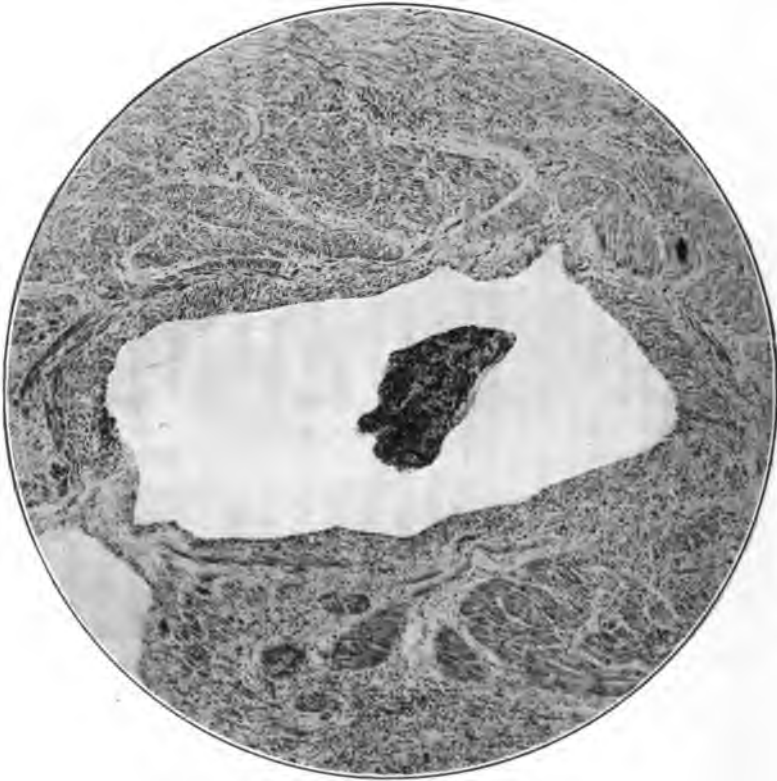


FIG. 11.—Vascular invasion deep in the myometrium, almost under the peritoneum. The invading elements are exclusively syncytial. (Second case.)

decidua but the uterine muscles too are invaded by syncytial derivatives.

With the object of controlling such occurrence I have examined two uteri removed with placenta attached. The illustration represents a section uterine wall from a fourth month pregnant uterus, removed for cancer of cervix. The illustration (Fig. 7) represents a section of uterine wall from a five months pregnant uterus removed



for retention of placenta in a uterus with multiple fibroids. In both instances, the cells of chorionic origin, infiltrating the myometrium are very scanty and scattered among the muscular bundles with no tendency to invasion of the blood-vessels.

As regards the contention, that such invasion is considerably greater in hydatidiform mole, Poso in his works of revision and selection of some 123 cases of chorionepithelioma has disputed various cases, which he concludes to be incompletely healed beds of molar invasion.



FIG. 12.—Case III. Uterus with broad-based tumor in posterior wall.

The extent of such invasion is shown in illustration 8 representing a section of uterine wall from a septic uterus, secured at an autopsy of a patient, dead after manual extraction of hydatidiform mole in the fourth month. In spite of the general diffused necrotic aspect of the uterine structures, masses of chorionic wandering cells practically maintain their form and vitality, ten days after the expulsion of the mole.

How confusing these histographic features are with a real chorionic tumor, made up of same cells, can easily be imagined. Teacher, still pointing out the greater differences in the variety of cell forms, and the greater degree of infiltration in the tumors, is led at least to admit that no sharp line can be drawn.

But that diffuse infiltrations of the myometrium, made up almost exclusively of such cells have been proved conclusively to possess all the essential qualifications of chorionic malignant tumors, is still doubtful.

From a biological point of view, as Ewing states, chorionic wandering cells, as ultimate transformation of the syncytium, represent elements of reduced vitality, and although they may proliferate, they seldom, if ever, develop a progressive tumor.

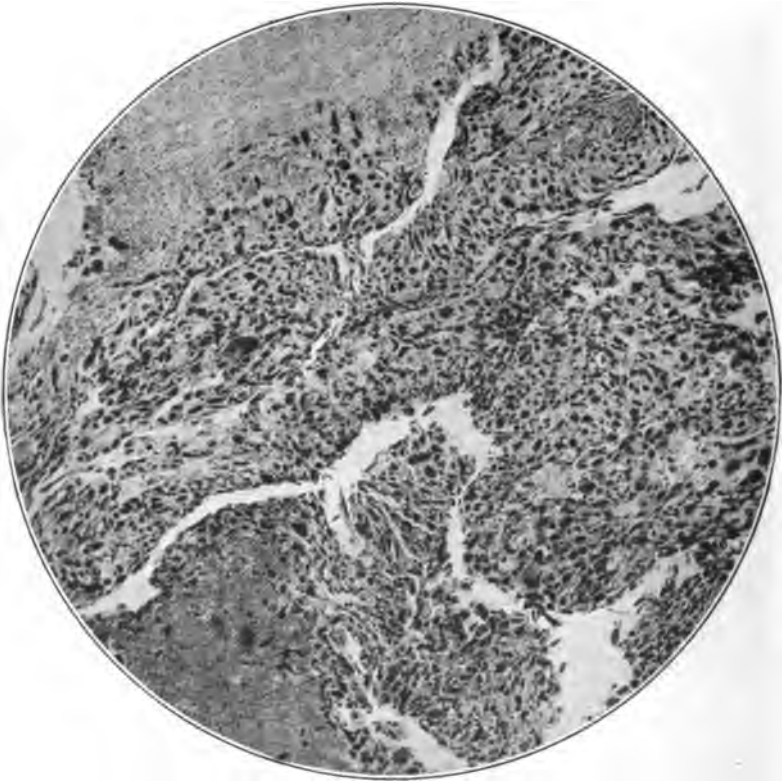


FIG. 13.—Case III. Syncytioma. Section from the base of the tumor deep into the uterus. Syncytium and derivatives are the chief constituents.

From the pathological point of view, if they infiltrate the myometrium, and are more or less diffused between the muscular bundles, they fail to show the pathognomonic features of Langhans or syncytial elements, consisting in the active external penetration of vascular sinuses, and vascular and perivascular invasion from within, explaining in the meantime the necessary absence of metastases *in loco*, or at a distance.

Clinically considered they may be fatal, in the sense that infiltrations of such cells may cause infection and rupture of the uterus (Elser-Ewing), but many of such cases have been repeatedly cured after simple curettage (Ruge-Blumerich).

A most typical demonstration of the fallacy in accepting this evidence of chorionic wandering cells in the invasion as a factor in diagnosing chorionepithelioma, is offered by the case of v. Franque, in which the first curettage revealed remnants of hydatidiform mole,



FIG. 14.—Case IV. Uterus secured by autopsy. It is possible only to note the irregular surface of the uterine cavity; unfortunately several nodules in the uterine wall are not apparent.

the second only chorionic cells, and the removal of the uterus an entirely regenerated uterine mucosa with no chorionic cells.

Outside the reasonable objection to the acceptance of such atypical form, for which the term, suggested by Ewing, of syncytial endometritis would seem more appropriate, the fundamental principle for a classification cannot be considerably shaken in respect to the first and second forms, one faithfully reproducing the primitive chorion in both its constituents, the other exclusively represented by syncytial elements and its cellular derivatives.

Pestalozza has raised a considerable objection against the necessity of classifications. Working on the accepted conception of the unity of origin of chorionic tumors, he tries to unify the anatomopathological expressions, and to explain the polymorphous variations, so frequently encountered, not only in the histography of different specimens, but in the various sections of the same specimen. He claims that each form of chorionepithelioma, in its origin, is invariably con-

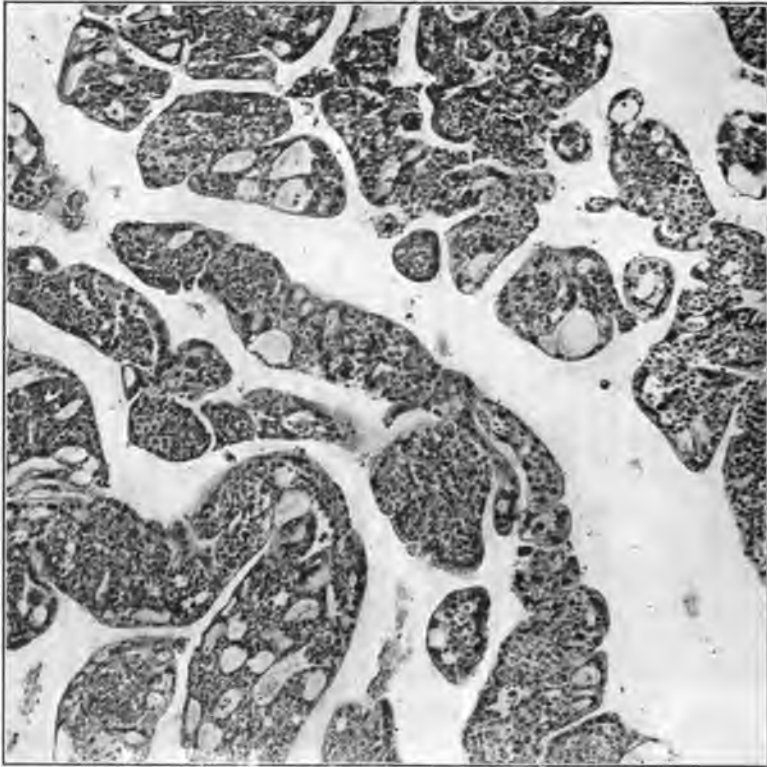


FIG. 15.—Case IV. Uterine curettings. Typical alveolar arrangement. The syncytium constitutes the fine texture of the alveoli, which are overcrowded with rapidly proliferating cells of Langhans.

stituted by both kinds of elements, representing the characteristic arrangement of syncytial elements in the periphery and Langhans' cells in the center. These last cells in time generally undergo necrotic changes, and the focus, when old, is made up of syncytial elements, sparsely diffused in fibrinous material, representing the result of the dissolution of the cellular elements.

But this interpretation, which would explain the process of regression in occasional foci, cannot be accepted as sufficient explanation of the exclusive syncytial type.

That one kind of element can give rise to a distinct tumor, without impairing in the least the unity of origin of these tumors, is perfectly reasonable, and is amply proved by the findings in regard to the syncytium.

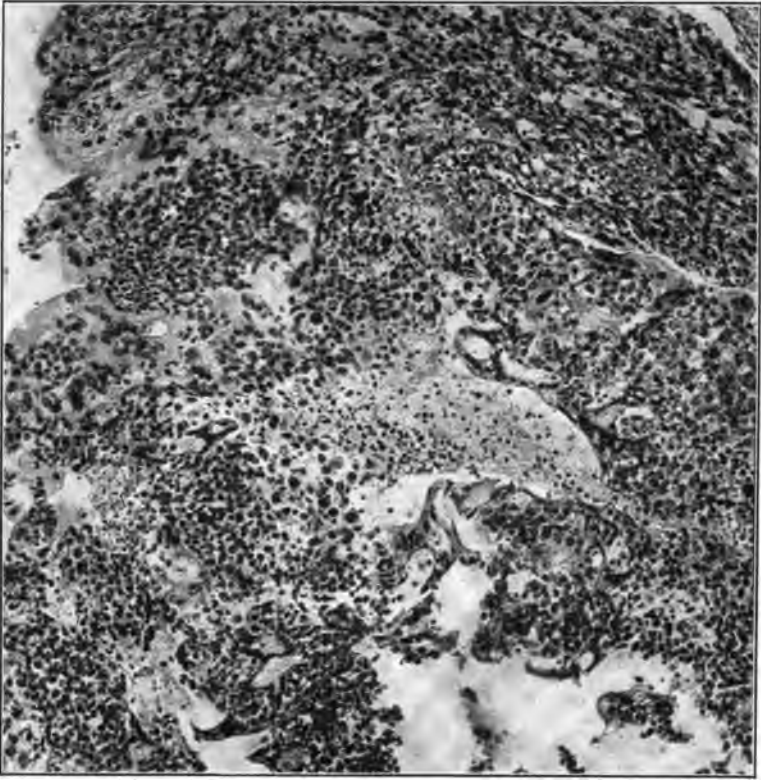


FIG. 16.—Case IV. Cervicovaginal nodule. The histological features are almost identical with those described for the curettings.

In each specimen examined, even in the typical form, there are many instances in which the syncytium, without any actual presence of cells of Langhans or fibrinous material which would suggest their past presence, is starting a new focus in some vessel. In all probability all initial foci start from the syncytium, as I will point out below.

This is in perfect accordance with the biological activities of the

syncytium, with its ability to grow and multiply, independently of association or direct affiliation with cells of Langhans.

That tumors almost exclusively composed of syncytial elements and their derivatives, originate as such, seems reasonably proved by the various instances reported, in which the original and metastatic growths are invariably identical in structure. (Schnauch statistics.)

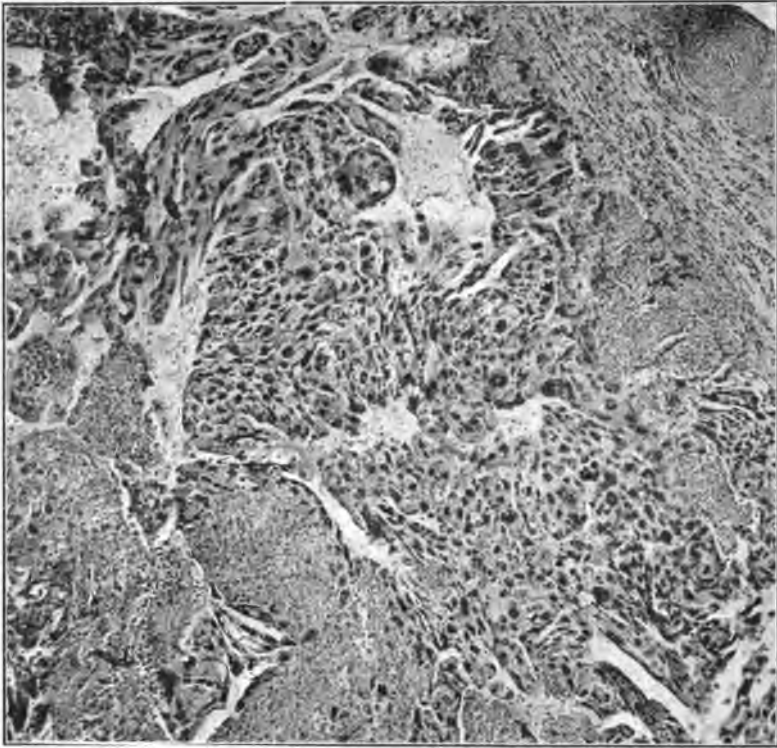


FIG. 17.—Case IV. Vulvar nodule. In marked contrast with Figs. 15 and 16, the syncytium is markedly preponderant and the whole structure has not attained the typical arrangement found in the older foci.

In this respect, we should consider it safer to accept the name syncytioma for any such case, leaving the definition of transitional, as we have previously said, for those cases in which the core of the villus is still present (*destruens mole: chorioadenoma malignum*), as more apt to convey the idea of passage from one form to the other.

To the typical form indeed, as the most definite and complete association of both representatives of the primitive chorion, in full power of activity, seems to be properly due the term of chorionepithelioma.

Ewing, in view of the fact, that the denomination of epithelioma is accepted to designate tumors of squamous epithelium, and with the object of having a more uniform scheme of classification, believes it more correct for this to receive the name of chorioncarcinoma, in coördination with the adopted term of chorioadenoma.

This is the form which anatomically, shows the most striking histological features of cells in active proliferation, with numerous mitotic figures, and extensive metaplasia of both Langhans' and syncytial elements.



FIG. 18.—Case V. Section of tissue removed from uterine cavity. Both elements, syncytial and Langhans, are rapidly proliferating. In spite of the presence of a few degenerating villi the active and independent epithelial proliferation was considered suspicious and the structure was pronounced chorionadenoma (Ewing).

The close study of the anatomical side, compared with the clinical exit of each individual case, undoubtedly points to the conclusion that the highest potential malignancy connected with this typical form, seems to be conferred by the presence and activity of the cells of Langhans.

In this instance again, as we have said for hydatid mole, if we believe with Curtiss in the fetal disappearance of the cells of Langhans, in view of their short life span, and consequent limitation of the supply of syncytium; or with Pestalozza in its conception of basing the polymorphism of chorionic tumors on the necessary phases of regression, we could easily explain the clinical differences in relation

to the anatomical. But the persistence and indefinite multiplication of the cells of Langhans in chorionepithelioma; the production of new syncytium and derivatives from syncytium, in advanced pregnancy and in syncytioma; and the rare occurrence of general regressions in true chorionic tumors, render those opinions not entirely satisfactory.

Teacher, in admitting the possibility of the derivation of the cells of Langhans from differentiation within the syncytium, has afforded a new basis for the interpretation of the anatomical differences.

Although the view of Teacher is completely at variance with the generally accepted knowledge about origin and mutual relations of the elements in the primitive chorion, Pestalozza agrees to admit,



FIG. 19.—Case V. The original focus in the right horn of the uterus is clearly shown invading the myometrium, and deep in the uterine wall the small darker independent focus.

at least for the pathological conditions of the chorion, the possibility of an indifferent alternation in the genesis of the two elements.

Without going into the details of the evidence and reasons submitted by Teacher in support of his opinion, will be here only sufficient to say that the principal conclusion we derive, is that commencing tumors, or initial metastases may exclusively be made up of syncytial elements.

With this conception, the cycle of evolution of each new focus can be given in the following way; the syncytial elements from their peripheral situation, are apt to be carried by the blood current. As soon as they become lodged in a blood-vessel, they start prolifer-



ating in the new focus, which only reaches the height of its evolution, when the cells of Langhans appear by differentiation within the syncytium.

In this way, we could easily explain the presence of Langhans' elements in chorionepitheliomas, arising after pregnancy at term, when normally such cells are missing. Although a persistence of the primitive chorion can be assumed, through a direct comparison

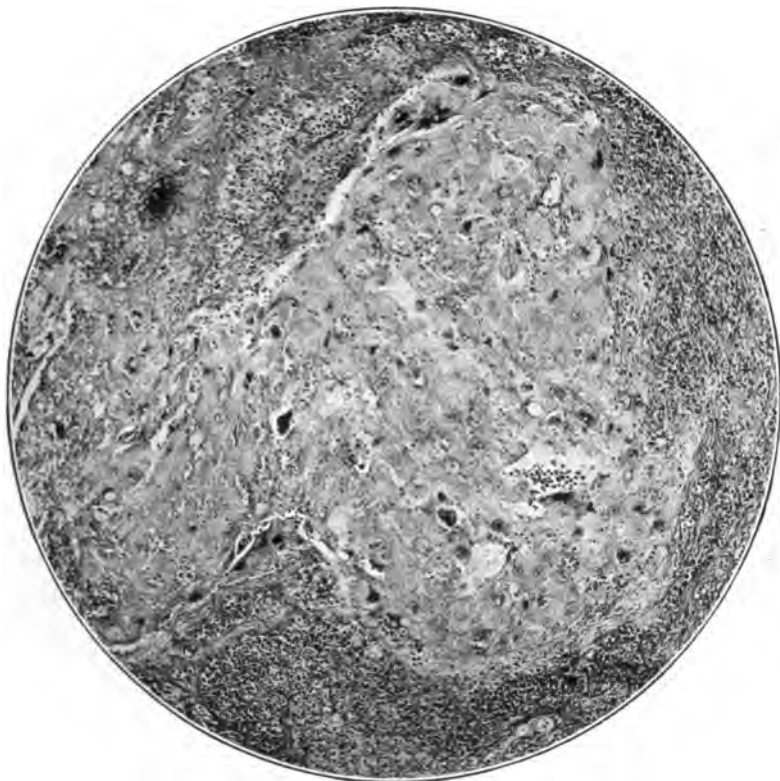


FIG. 20.—Case V. Section from the deep independent focus in the myometrium. Chorionepithelioma in phase of regression. The epithelial elements are in all appearance necrotic and are actually surrounded by a complete leucocytic wall. Nothing is suggestive of the presence of the core of the villus.

with the laws governing the biology of other tumors, we cannot exclude the possibility of a reversion to the primitive type, from the old dormant syncytium to a young one, and to a differentiation of the same.

Accordingly, it would be reasonable to conclude that the more complete such persistence or reversion would be, we were confronting

the identical activities of unrestricted proliferation, and invasion proper to that early stage. From the other side, the inability of syncytium to evolve to a more complex structure would be responsible for the limitations imposed upon the extension and diffusion of the diseases.



FIG. 21.—Case V. Detail of Fig. 20. Extreme limit of the focus toward the protective zone.

#### PROGNOSIS.

Schmauch and Velits, from a comparative study of the statistics arrive at the conclusion, that syncytioma has proved to be of slower progress and generally of more moderate malignancy than typical chorionepithelioma.

My series of six cases with complete data, anatomical and clinical, bear out the same evidence.

In the second case, the uterus, removed a long time after the beginning of the disease, and after repeated curettages, shows a tumor

made up almost exclusively of syncytial elements. No recurrence after operation, and the woman is in good health to-day.

The third case, although not so fortunate, had a long course, almost one year, and death occurred several months after the operation, in spite of the fact that at this time she showed very suspicious pulmonary symptoms. The chief constituents of the tumor are syncytial elements and derivatives.

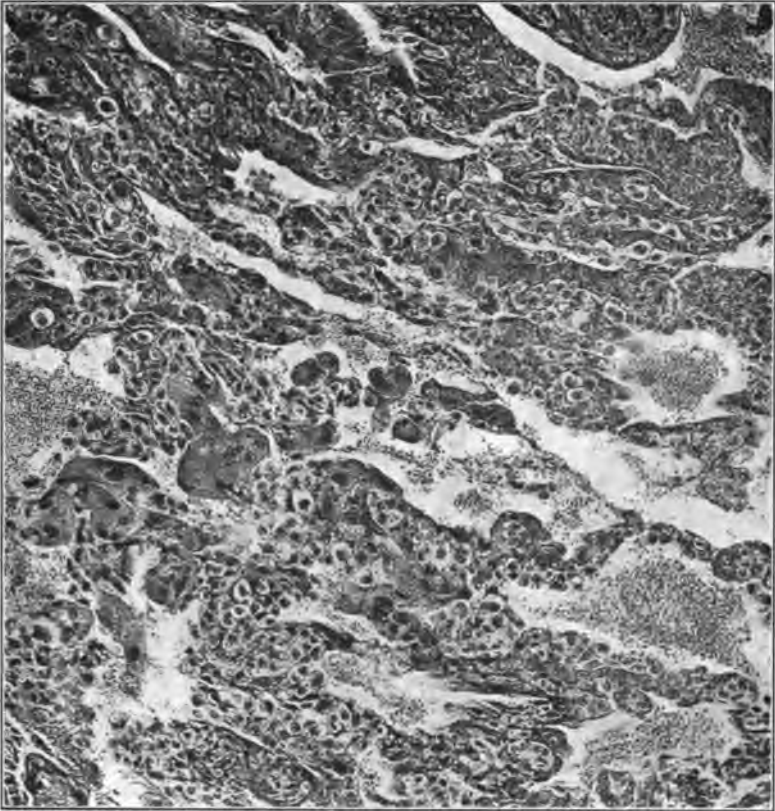


FIG. 22.—Case VI. Chorionepithelioma. Uterine curettings.

All the typical chorionepithelioma have had a rapid course and fatal exit.

It seems, thus more than reasonable to accept the statement which Ewing derives from his careful revision of the statistics of Schmauch that we can establish a very definite relation between the histological structure of these tumors and their clinical course.

And in conclusion, we would be justified in accepting the general

principle, that the inability of the syncytium to evolve to a more complex structure is really responsible for the limitations imposed upon the extension and diffusion of the lesion.

It is not our purpose to state that the clinical course must be invariably dependent upon the histological structure, but only to emphasize its importance as a principal factor in the evolution which might otherwise be influenced in a secondary way from other factors.

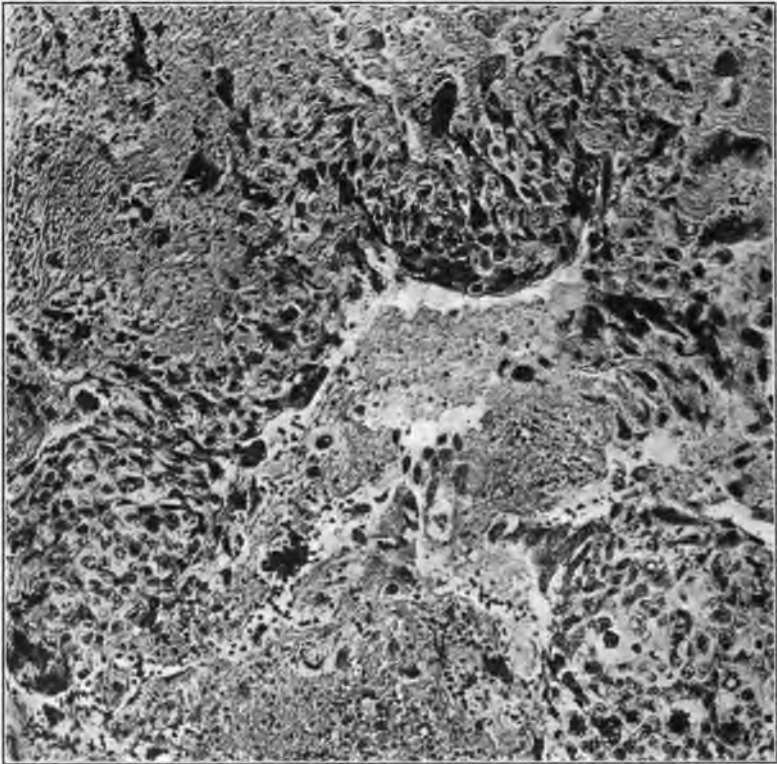


FIG. 23.—Case VI. Vulvar metastasis.

If the favorable prospects of cases operated upon early could be taken in account, there again the potential malignancy inherent in the anatomical constitution is the chief efficient cause of the ultimate result. In the first case of my series, for instance, early surgical interference was unable to arrest the rapid progress of the disease, while the second in spite of very late removal of the uterus, was definitely cured.

The other factor, which should be carefully considered in its rela-

tive influence on the prognosis is the anatomical regression of the tumor's foci. Although this is an actual fact, proved by various instances, the determining causes of it are still obscure, and its beneficial inference should not be overestimated.

If we could, by generalizing, accept for each individual focus a necessary process of involution, interpreted as an essential result of the short life span of the cells of Langhans and their ability to coagulate the surrounding blood, the reason for the regression and consequent spontaneous cure could easily be explained.

But the relative protection afforded to the central cells by the surrounding syncytium, the very presence of uncoagulated blood found within the cells of Langhans, lead us to believe in essential biological differences between tumor cells and their physiological homologous.

It is a fact, however, that typical chorionepithelioma, either in its primary state of development, or in metastatic foci, no matter of how long standing, only occasionally shows processes of involution.

Regression instead, not limited to occasional involution, but interpreted as a more complex process, consisting in a general biological exhaustion involving the whole tumor is more likely to occur in chorionadenoma and syncytioma (Ewing).

The fifth case of my series offers a striking example of regression in a focus deeply situated in the myometrium and surrounded by a thick wall of round-cell infiltration. Considering this case, as the details of the history show, we find the regression related to a tumor only moderately active as a transitional form. In a very similar specimen brought for examination to this Department (case of Taylor), the vaginal metastases and the uterine tumor are chiefly constituted by syncytial elements in necrosis.

It is then logical to conclude that the possibility of regression is only inversely proportionate to the potential malignancy of each individual tumor. And even external factors believed to bear upon such fortunate results as local or general reaction, may not act but secondarily and in an inverse sense. In fact with highly malignant tumors the local reaction is practically absent, while only with less active tumors, where the invasion and destruction is slight, there such reaction is present.

We should not take these undeniable differences of potential malignancy relative to specific structure, or even regressive processes, as the basis for optimistic views which would only be erroneous and misleading.

PRACTICAL DEDUCTIONS RELATIVE TO DIAGNOSIS AND TREATMENT  
FROM THE COMPARATIVE ANATOMICAL STUDY OF HYDATIDIFORM  
MOLE AND CHORIONIC TUMORS.

Our inability to determine the future course of hydatidiform mole is dependent, not so much upon the insufficient knowledge of the differences in the activities of the chorionic proliferation, as upon the difficulty of securing the evidence of the uterine invasion. From the extent of the invasion and the characters of the infiltration elements combined, we would be enabled to argue more definitely about the outcome.

The limitations of curettage, which is deemed to be incomplete in the best circumstances, are greatly increased in the uterus generally softened and friable from the presence of the mole. Even when repeated at short intervals, as often suggested, curettage will not give sufficient guarantee of absolute removal of remnants deeply implanted.

Curtiss and Ovi, for instance, look to this practical difficulty as the main hindrance toward a correct diagnosis, and wish for some technical improvement to overcome such defect.

It seems, however, that we possess in the anterior hysterotomy, done through the vaginal route the most simple and effective means of obtaining a thorough removal of molar remnants, and at the same time of securing some small section of the uterine tissue, wherever the grafting is sufficiently deep.

Vaginal metastases in hydatidiform mole should not always be considered of a benign type. The recognized fact of innocent deportation of villi in normal pregnancy cannot be taken to mean the same for hydatidiform mole. The exaggerated ability of proliferation of the chorionic epithelium in hydatidiform mole is to be credited as favoring the development of a tumor.

Led by the assumption that the metastases in hydatidiform mole are invariably innocent, we might easily be induced to make the same error as Bertino, the error of regarding the vaginal metastases coincident with a mole, of a benign character. Subsequent development of chorionepithelioma thirteen months afterward, which did cost the patient's life, is sufficient to prove the fallacy of too much optimism based upon some exceptional fortunate case, and upon generalizing upon the possibilities of cure from the necrotic features of the pathological specimen. On account of our inability to better determine when the regression is complete and to exclude the possibility that very active cells might spring from a regressive

focus to new metastases, we would unfortunately be led to delay radical intervention.

The presence of the core of the villus in suspicious cases is not sufficient to exclude the possibilities of malignant changes, especially if there is presence of vacuolated plasmodium, and marked preponderance of cells of Langhans.

These last cells should be considered almost pathognomonic of malignancy when they are present in uterine curetings at unusual times, as in remnants of abortions in latter months of pregnancy, or after the term. Although there are undeniable clinical differences associated with anatomical variations, all forms of chorionic tumors ought to be treated according to the general criteria adopted for malignant tumors.

#### CONCLUSIONS.

1. We cannot accept as absolutely correct the plan of unification of Nathan Larrier and Brindeau, which makes of hydatidiform mole the first stage, not necessarily followed by the second, chorionepithelioma, on the belief of the common anatomical and physiological behavior of the elements in both conditions. But the more we find reproduced in hydatidiform mole the features of the primitive chorion (vacuolated syncytium, Langhans' cells in active mitosis, comparative disappearance of the connective tissue core of the villus), the proliferation assumes a very suspicious significance.

2. The real evidence of the malignant tendencies of hydatidiform mole can be obtained by a close investigation of its relation with the maternal structures.

3. The invasive mole deserves to be credited as a form of passage to chorionepithelioma. Most of them are real transitional forms, and the best denomination to be assigned to them is that of chorionadenoma malignum.

4. The core of the villus is not to be considered as a factor of exclusion in the diagnosis of chorionepithelioma.

5. The reduction of the classification of Marchand to two types syncytioma, and chorionepithelioma, finds an almost uniform support in the study of the statistics, as it seems to exactly correspond to the anatomical constitution of chorionic tumors, and has a decided prognostic significance.

#### REPORT OF CASES.

Of seven cases, which came under my observation and treatment, one, the first of the series of three cases, reported in the *AMERICAN*

JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, No. 4, 1911, has been excluded from the present research, the relative pathological material being missed.

Of the six other cases, four previously reported will be briefly considered in their histological details. The two last, not yet recorded, will be completed with a summary of the clinical history.

I. M. L., aged twenty-six years (second of the first series). Chorionepithelioma, following normal confinement at term. Section from a vaginal tumor, removed twenty-eight days after the confinement. (Microph. Fig. 9.) Syncytial and Langhans' elements are represented in fairly equal proportion.

Although the curetings, obtained at the time of the excision of the vaginal tumor, showed marked chorionic proliferation; the findings in the uterus, removed later, were negative.

The patient died eight months after the confinement, with recurrence in the pelvis and marked renal symptoms.

II. C. S., aged thirty years (third of the first series). Syncytioma, following hydatid mole. Section from the curetings (Fig. 10). The proliferation is made chiefly at expense of the syncytium. Cells of Langhans are present, but they are scarce, and are scattered among the syncytial elements, with no typical arrangement. No villi are present.

The histological examination of the tumor and posterior wall of the uterus, site of implantation, shows the superficial part of the tumor, necrotic. The deep sinuses in the myometrium are invaded exclusively by syncytial elements (Fig. 11).

It is necessary to note, that the patient had been ill for many months, and had been curetted three times, before she came under my care. At this time, the tumor had almost entirely destroyed the posterior wall of the uterus, and was ready to break through it. Marked saprophytic infection was present. The necrotic aspect of the tumor was not due to the infection, which disappeared after the curettage; and besides, the curetings, obtained only six days before the uterus was removed, showed a very active proliferation. The appearance of necrosis, instead, had been induced by carelessness in the fixation of the specimen.

The patient is living and well to-day, eight years after the operation.

III. G. B., aged forty-three years (Reported in *The Post-Graduate*, January, 1912). Syncytioma. The patient had been suffering with metrorrhagia for almost fifteen months, after a single suspension of menses. She had been curetted several times before she came under my care in December, 1910.

The curetings obtained at this time were found to be suspicious, for the presence of large syncytial masses diffused in the surrounding coagulated blood and fibrin.

The recurrence of uterine hemorrhage justified the removal of the organ.

The uterus (Fig. 12) shows a widely based tumor implanted in the posterior wall toward the fundus.



Histologically the tumor is made up preëminently of syncytial elements. The cells of Langhans are hardly present. No villi (Fig. 13).

The patient recovered from the operation, in spite of the fact that at that time she had developed pulmonary symptoms, pointing to metastases. She died five months afterward with pelvic recurrence.

IV. C. C., aged twenty-seven years (THE AMERICAN JOURNAL OF OBSTETRICS AND DISEASES OF WOMEN, No. 3, 1916). Chorion-epithelioma, following hydatid mole, at the fourth month, delivered manually and with curet in February, 1913.

In June of the same year profuse metrorrhagia. Vulvar and vaginal metastases rapidly developed. At no time the patient was deemed able to stand a radical operation. She died in August with general metastases.

The uterus secured through autopsy is represented in Fig. 14. Although the picture does not show it, it is studded with several typical nodules in its exterior aspect. Although the cavity is free from a definite tumor, the endometrium is generally covered with friable irregular masses.

*Histological Examination.*—The curetings (Fig. 16) show a distinct typical arrangement. Broad syncytial bands are disposed in a definite network, in which meshes the cells of Langhans are grouped.

A quite similar histological picture is represented in Fig. 15, reproducing a section from a cervicovaginal nodule.

But in marked contrast with the preceding is Fig. 17, representing a section from a vulvar nodule, removed as soon as it appeared. In this the syncytial elements are conspicuously preponderant. The cells of Langhans are scarce and scattered with no typical arrangement. There is nowhere any evidence of regression to justify such difference, which instead I would attribute to incompleteness of evolution, according to the view of Teacher.

V. Chorionepithelioma in regression. C. N., aged twenty-seven years. Porto Rican. Married six years, para-ii. Last child three years before present illness.

In May 13, 1915, after two suspensions of menses, the patient had a severe uterine hemorrhage. After two days she was admitted to the City Hospital and was curetted for incomplete abortion. She was discharged May 27.

In the seventh day of June, recurrence of profuse hemorrhage. Admission to the Italian Hospital and curettage June 10. A rather thick piece of tissue was obtained, which was considered adherent placental remains.

The histological examination of this tissue reveals the presence of only occasional degenerating villi, but extensive chorionic proliferation. The syncytial elements are markedly vacuolated, the cells of Langhans are actively proliferating, and filling the lacunæ, among the syncytial strands (Fig. 18). The opinion of Ewing, to whom the sections were submitted, was that the case should be watched, as the pathological evidence was pointing to a transitional form (chorioadenoma).

The bleeding in fact reappeared, and the uterus was removed, the third of July, 1915.

The uterus (Fig. 19), slightly enlarged, shows nothing of note in the exterior surface. In its cavity, the uterus presents a fungous irregular mass, in the region of the right horn, adherent to the underlying tissue. In the anterior wall, deep into the muscularis, 2 cm. under the mucosa, a small dark nodule is distinctly visible in the same illustration.

Histologically, the tissue in the cavity is perfectly identical to the one obtained with the curettage, excessive epithelial proliferation, only occasionally a degenerating villus.

The nodule in the myometrium is a regressing focus (Fig. 20), cells of Langhans and syncytial elements, sparse in the surrounding fibrin, are in evident states of necrosis. No trace of villi. What is most interesting to notice is the perfectly solid wall, surrounding the focus, constituted by a leukocytic infiltration.

*Remarks.*—We realize that many would consider this case as doubtful. But the metastatic characters of the focus in the myometrium, independence from the main mass in the uterine cavity, and corresponding mucosa normal and showing no evidence of invasion, are sufficient to justify the classification of this case as originally chorioadenoma malignum, with an evident chorionepitheliomatous focus in regression.

VI. Chorionepithelioma, following a normal confinement. R. A., aged thirty-four years. Italian, para-ii. Last normal confinement, October 17, 1915. November 30, profuse metrorrhagia. Recurrence of severe bleeding at short intervals.

January 26, 1916, the patient was admitted to the Columbus Hospital. She received there the first surgical treatment and was dismissed after a few days.

At the end of February, the patient came under my care. I curetted the uterus, and removed a small vaginovulvar tumor. A radical operation was refused, and the woman died six months after the confinement.

The sections from the curetings and the metastases (Figs. 22 and 23), both show the typical arrangement of malignant chorionic proliferation; central nuclei of cells of Langhans surrounded by syncytial elements.

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## OBSTETRICS. A BRIEF REVIEW AND A LOOK TO THE FUTURE.\*

BY

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VILLIERS-LE-DUC, a rural commune of the French Midi, from 1893 to 1903 had an infant mortality of zero, and no maternal death due to childbirth. During fifteen years but one stillbirth occurred. This report has been confirmed by the French Academy of Medicine.

Before this Association was born, the Mayor of that town obtained a perfect score. His methods were direct, thorough, and complete. The striking feature is administrative authority combined with medical knowledge, resulting in all measures of safety being thoroughly carried out in all cases, without exception.

Before referring to these measures more in detail, I wish briefly to review what this Association so far has done to obtain for the women of this country better obstetrical service. Then to suggest what is left to be done in the future.

*Infant mortality statistics* give prenatal and obstetric care the responsibility of about 40 per cent. of infant deaths, *i.e.*, deaths in the first month, and show that this per cent. is rising and the actual number increasing. Add to this the stillbirth rate and reduced infant vitality, also the maternal morbidity and mortality of childbirth, we then see the whole responsibility of obstetrics. Child-bearing may, therefore, be defined as a normal function dangerous to public health. In what other field of public health work to-day is there opportunity of saving more lives or preserving more health?

Evidently the public is not yet aroused to the importance of this critical period of human life. To arouse them to action is our specific task.

The task this voluntary Association has undertaken is not only to collect evidence of unsatisfactory conditions, but to discuss and define standards and methods best suited to aid in the successful bearing and rearing of families to healthy childhood and motherhood. This we have already done in almost every phase of the subject.

\* The Chairman's Address before the American Association for the Prevention of Infant Mortality, Milwaukee, October, 1916.

Our *Transactions* catalogue the facts in thirty-five papers with important discussions bearing directly on obstetrics, many sub-committee investigations, and reports of the experiences of the 151 affiliated societies. Thus we have learned that the condition of obstetric practice in this country to-day is briefly as follows:

1. A large number of *medical schools* with obstetric departments, of which a few are good, some fair, and many poor. The professors ill-equipped, turning out many graduates with little or no training in obstetrics. The schools are improving a little, but slowly.

2. The *family physician* in general clings to even the difficult cases in obstetrics with a jealous tenacity. He rarely calls in expert assistance, reasoning that if midwives can care for such cases, certainly he can. Seldom does he examine intelligently his patients during pregnancy to obtain accurate obstetric facts, which might reassure him in the subsequent care and confinement and be a great safety to his patients.

3. The *fee* in private practice ranges from \$7 or less to \$25 and more, seldom, except in large cities, a fee adequate to the worth of even fair service. It pays the doctor more money to-day to repair the results of bad obstetrics than to prevent such results.

4. Each large city and state has different laws and customs in regard to the *midwife*, resulting in a chaotic state of the practice of obstetrics throughout this country, ranging from unrestricted license, simple registration, education and supervision to the point of police control, or, on the other hand, to nonrecognition, like any other unqualified person, as in Massachusetts.

5. We have learned that large cities present *different obstetric problems* from each other, from small cities, towns, and rural districts.

6. The larger part of *the public* and many physicians consider childbirth a simple normal function and, therefore, often unknowingly take risks no good farmer would take with his live stock.

7. Life *insurance* companies refuse to insure pregnant women. The unborn child is a risk that would shock an insurance medical director.

8. The *medical profession*, who might successfully lead to a rapid solution of the problem, is, I regret to say, ununited in any constructive effort to improve the situation.

*Actual results* of the work of this Association cannot easily be totaled. Such results are largely accomplished by the *members individually*. The inspiration to one attending a meeting has many times resulted in formulating work of a progressive and extensive

nature for his or her city or town, bringing enormous saving of waste in maternal and child life and health.

As a result of these meetings our minds have been cleared, our courage renewed, and our patience reënforced to meet the difficult problems of child welfare.

#### THE FUTURE.

In formulating a program for this meeting, a letter was written to each of those who now compose the Obstetric Committee of this Association with the request for suggestions of what they considered was most needed to obtain "Better Obstetrics."

I propose now to give the suggestions thus received and beg that you will consider them seriously with the idea of selecting the most hopeful for a program for next year.

1. Dr. G. W. Kosmak suggested "Obstetric Nursing" as a topic for future study.

2. He also suggested a report on the improvement of obstetric teaching to determine if progress had been made since Williams' notable investigation showed the lack of good teaching to be our fundamental difficulty toward "Better Obstetrics" in this country.

Williams replied to my inquiry that with three exceptions very little has been done to improve the teaching of obstetrics since 1912. The three improvements he mentioned are:

1. The opening of the Magee Hospital in Pittsburgh.
2. The union of obstetrics and gynecology, and placing the combined department upon a full-time basis at Yale.
3. The building of a woman's clinic and the placing of the joint departments of obstetrics and gynecology upon a full-time basis at the University of California.

"Possibly there might be added to these," Williams continues, "the partial completion of the new Lying-In Hospital in connection with De Lee's work in Chicago." I wish to add that in many general hospitals pavilions or wards have been added recently for obstetric cases.

3. The *standardization of hospital treatment* of obstetric patients was suggested by Miss Ellen C. Babbitt and Dr. Williams. They think that if cases were kept under observation more than ten to fourteen days, there would be more breast-feeding and less babies would enter foundling hospitals.

4. Along the same line Miss Edna Foley of the V. N. Assn. of Chicago writes:

"Can some one discuss the subject "*A minimum standard of*

better obstetrics?" How may it be obtained in small hospitals? Will State or local inspection of each baby born bring us to this standard more quickly than more adequate teaching in medical schools? Unfortunately, there are a great many poor medical schools and poor hospitals that can only be brought to a good minimum standard by State control.

5. "To get inspection of each new-born baby is, of course, another way of saying—complete birth registration—but it would do more than this, it would find the bad eyes, the poorly delivered children, and the septic mothers far better than they are being discovered to-day. I sometimes think that *only undertakers and district nurses* in our sort of work discover these conditions, and we, unfortunately, have no redress unless we suspect malpractice, and even then we must be very sure of our ground or we receive scant sympathy when we report the case."

"A minimum standard of better obstetrics, enforced by State or local health department with inspection of every baby born, would help a lot in our large cities, as well as in our rural districts. Perhaps this subject is too large an order for the next conference. It is, however, one of the crying needs in district work, and I hope that some day it may be discussed nationally, and locally as well."

6. Mrs. West, combining the experience of a mother with the national responsibility of the Children's Bureau, writes as follows:

"Certainly a woman who gives a child to the country has an *inherent right to the best care* that can be given, and we should be fighting for the establishment of this right. We should in a spirit of great sympathy educate mothers and fathers in what is meant by the term "good obstetrics" and endeavor to offer the best possible service to this righteous demand."

7. Miss Minnie H. Ahrens, Superintendent of the Infant Welfare Association of Chicago, in reply to my question "how to awaken the public to the need of *better obstetrics* and what this may accomplish," suggests that the different cities interested in infant welfare form *committees of lay women* to study and solve this problem locally. She believes this would create the desired public opinion better than could be done by professional people.

8. Dr. J. F. Moran of Washington reiterates the medical profession's oft-repeated solution of the difficulties as follows:

"Education and legislative control are essential. Education of the physician to do better obstetrics, and education of the laity to the need of prenatal care, as well as at the time of labor.

"The only way to do away with the midwives is by legislation

and it is useless to expect to obtain this until the profession provides competent attendants to take their place."

9. Dr. Peterson gives a similar professional view of the situation in his State as follows:

"In a State like Michigan the principal reason for poor obstetrics is that the practitioners from time immemorial have preached that pregnancy, labor and the puerperium are physiologic conditions. The public naturally concludes that if that be so they should not be paid for. What is not paid for is poorly done. This part of the practice is neglected for something else that pays better. In this part of the community the people would pay more attention to obstetric needs and take better care of themselves, if they paid their doctors better prices.

"The rural baby in Michigan is delivered by the doctor who only sees the patient once afterward unless there be complications. In the larger cities, I imagine, the poor people are being better and better taken care of through local charities."

10. "It seems to me that we should urge the necessity of state laws compelling physicians to record miscarriages and stillbirths. This certainly would help us a great deal in our work. Poor prenatal care and ignorance on the part of the expectant mother is responsible for a great deal of miscarriage. The registering would aid greatly in determining the causes."

11. Dr. Swartz of St. Louis writes the following:

"In St. Louis, obstetrical conditions are not bad, but of course, there is plenty of room for improvement. Washington University Medical School conducts a sort of model plant for the very work which your society tries to improve. We are not able to take care of the entire city nor do we desire to do so. We expect other agencies and especially the *city* to *imitate* and *improve our work* and make it cover the whole community.

"An *obstetrical dispensary*, which is well patronized, is carried on in my department, in first-class quarters, with a competent staff of physicians, prenatal nurses and social service workers. The expectant mothers are delivered at their homes if these homes are suitable and if there are no serious complications; otherwise, the cases are transferred to my obstetrical wards on the medical campus; after delivery the patients receive medical and nursing care. When they are finally discharged, the babies are automatically transferred to a babies' clinic, formerly to our dispensary for children, now to a clinic for well babies. For years over 90 per cent. of our babies have been breast-fed."



12. "Counties must put up hospitals as they put up school houses. To these the rural expectant mothers can go for delivery with the same satisfaction of exercising their good right as they have when using public schools.

"The county must furnish the nurses. I am establishing a six-months' course for registered nurses which shall qualify them to do obstetrical work within certain limitations."

3. Dr. J. Morris, Slemons of New Haven writes:

"One of the greatest opportunities for reform lies in the field of out-patient obstetrical service. In most medical schools this service is very loosely handled; students are allowed to treat cases more or less as they please; they get into bad habits and these become life-long. What we need is to have the out-patient service under the direction of one of the hospital staff and every case should be attended not by a student alone but also by a doctor and a nurse. This would go far to raise the dignity of obstetrical work in the eyes of the students, and what is more important would result in their learning better methods and in the patients receiving better treatment."

In the *London Lancet*, April 22, 29, and May 6, 1916, the Milroy Lectures on "Infantile Mortality" by Moore describe, among other interesting things, the methods and results employed by Dr. Morel, Mayor of Villiers-le-Duc, by which methods the perfect results already referred to were obtained.

To those of us who had already despaired of perfection in this life this story may revive hope. Certainly the methods should command our respect and close study. Many desirable details are lacking in the brief reports, but the chief facts are as follows:

The mayor of the town, M. Morel, took a deep interest in infant mortality and its problems. In order to satisfy this interest, he studied medicine, taking a medical degree. He formulated regulations of which the following are to us the most interesting:

I. Every expectant mother has the right to require the help of the village authorities.

II. In order to get this help she must declare her condition of pregnancy at the mayor's office before the seventh month and select a midwife to attend her. The midwife must visit and examine her and exclude albuminuria, contractions of the pelvis, and dangerous presentations, for which the midwife is paid five francs from the Free Medical Aid Fund.

III. If abnormal, a medical man of her own selection is called to treat and deliver her successfully and paid from the same fund.

IV. If labor is not ended in twenty-four hours, the midwife must call a doctor.

V. Every woman so assisted shall have a grant, about \$2.50 per day, for six days, if she remains in bed, paid from the Fund after the six days.

VI. Every partly or entirely bottle-fed baby must have milk sterilized and must follow written directions of care. Inspection by doctors is provided in all such cases.

VII. Every infant placed out is weighed every two weeks on the *communal baby-weighing machine*.

VIII. Every nursed or bottle-fed child getting sick must be notified to the municipality within forty-eight hours from first symptoms.

IX. Every wet-nurse bringing up a child to one year in good health has a right to a grant of 50 cents per month dating from the time she nursed the child to one year.

Moore, from the point of view of a health officer, who has tried with some success to reduce infant mortality in Huddersfield, England, makes the following critical comments:

The chief factor of success in Villiers-le-Duc was the absolute *unity* of administrative authority combined with medical knowledge. The next essential was *completeness*, in that it deals with *all* needy mothers and infants. The prospective mother was required to give *notice of pregnancy*. The people were not merely advised, but *ordered* to do certain *specific things*.

"It is worthy of note," says Moore, "that in one of the most democratic countries in the world (France), a Republic, whose watchwords include Liberty and Equality, these things are *ordered* to be done. That the orders were obeyed is vouched for by the results."

Moore's proposal in 1904 that pregnancies be notified to the authorities was met in England by some with ridicule. It was said this would "violate family privacy."

To which he answers, "It appears to be quite a commonsense thing that the State should concern itself with the welfare of the mothers of the race. It does not seem to me to be a very singular or extraordinary project that when a woman is about to become a mother the authorities should take notice of the fact, with a view of helping her and with a view of ensuring that when her time of trial comes she shall have adequate assistance; that endeavors should be made beforehand to ascertain that all is well and to take what

measures may be to remove dangers." In other words, to ensure intelligent prenatal and obstetric care.

One of our speakers at the Boston meeting two years ago independently emphasized the value of *reporting pregnancies* to the health authorities as follows:

"Is it not conceivable that some day we may advance to the point of civilization where notice of expected babies may be required by the health authorities in order that these authorities may receive assurance that reasonable provision is made for the safety of mother and baby, and that preventable danger to valuable citizens may, by appropriate means, be foreseen and avoided?"

"Nowhere could the state or city spend money to better advantage than in safeguarding her mothers."

Moore incidentally makes one other interesting suggestion that every child in the elementary grade be taught a simple catechism of hygiene. He continues, "Is it not an astounding fact that though on the treatment of offspring depend their lives or deaths, and their moral welfare or ruin, yet not one word of instruction on the subject is ever given to those who by and by will be parents? Is it not monstrous that the fate of a new generation should be left to the chances of unreasoning custom, impulse, and fancy?"

*Conclusion.*—The lines of *future progress* it seems to your chairman are these: In order to obtain effectiveness and completeness, I suggest the notification of pregnancies to the local health authority. These notifications should be treated confidentially and might at first be voluntary, but later should be required. This would furnish the necessary information to the health authorities, who should be required to determine that proper prenatal and safe obstetric care is assured to each prospective mother.

Greater publicity through committees of lay women seeking further extension of prenatal care.

Standardization of hospital obstetric care, establishing a minimum standard and ways to enforce at least that standard, by such means as inspection of each baby born.

To provide the means for better obstetrics, seek health insurance with maternity benefits.

Improve teaching of obstetrics both in the medical schools and in district work in the homes.

Develop further our methods and opportunities of teaching mothers and fathers the value of "better obstetrics," and the older children a health catechism.

While publicity is our chief weapon, we may as well face the fact

that we shall not get much farther until we have the backing of authority. I, therefore, make the following proposal for next year's program:

Whereas pregnancy is a normal function proved dangerous to public health, and whereas the different branches of public health, federal, state, county, and city, have already done much, in a few striking instances, to obtain better standards in obstetrics, we hereby invoke the aid of *all* public health agencies and officers universally to aid in this branch of preventive medicine.

I, therefore, suggest as a title for our next year's study "Public Health Authority and Better Obstetrics."

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### ATTEMPTED ABORTION IN THE ABSENCE OF UTERINE PREGNANCY.

BY

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CRIMINAL abortion is steadily on the increase in all civilized countries and in view of the enormous number of self-induced abortions it is extremely probable that such attempts are often made where the fear of pregnancy is unfounded. Not only is *attempted abortion in the absence of pregnancy* not as rare as is sometimes supposed but it is of considerable gynecological importance on account of the associated dangers which are even greater than those of criminal abortion where pregnancy actually exists. The subject has attracted very little attention in this country and its introduction into European gynecological literature is of relatively recent date. On closer investigation, however, an astonishingly large number of observations along this line will be found scattered through gynecological periodicals and according to the reported cases it is advisable to make a distinction between the two following groups:

1. Cases of attempted abortion in which the uterus is empty and pregnancy does not exist.
2. Cases of attempted abortion in which the uterus is empty but in which there exists an ectopic pregnancy.

The *very high mortality* (about 43 per cent.) according to the recent and extensive investigations of Liebeck is explained by the *reckless repetition* of the determined woman's futile efforts to *interrupt a fancied pregnancy*.

In those who are already *endangered* by the existence of an *ectopic pregnancy*, the sequelæ of attempted abortion are likely to prove especially serious if not actually fatal.

The dangerous character of attempts to induce the premature expulsion of the ovum in an erroneously assumed pregnancy is illustrated by a personal observation at the Harlem Hospital, New York, (Dr. Brodhead's service), on a para-v of forty-three years, near the menopause who attributed a six weeks' retardation of the menstrual flow to pregnancy and adopted artificial means for its arrest.

The introduction of an alum stick into the uterus was followed by a chill lasting one hour and followed by fever. There was persistent vomiting for a day with general malaise. The patient complained of hypogastric pains and a considerable amount of bloody discharge was passed from the vagina.

When first seen, three days after the attempted abortion, the patient was in a serious condition with a temperature of 102° F. and pulse about 120. The abdomen was tender and somewhat distended. On vaginal examination the anteflexed uterus was palpable, slightly enlarged and extremely tender, especially at one portion of the anterior wall. There was nothing abnormal about the parametria and adnexa. Diagnosis: Infected incomplete abortion (?). Therapy: The uterus was curetted under all necessary precautions. A small amount of tissue with a fetid odor was removed.

At night following the curettage the patient's temperature rose to 105.6° F. and three days later she died of general septic peritonitis. A postmortem examination showed no signs of an existing pregnancy either macroscopically or microscopically. (The postmortem and microscopical examination was performed by Dr. Schulz, at that time coroner's physician.)

Hypocritically we might say that this is a case of attempted abortion in the absence of pregnancy by a woman forty-three years of age who apparently mistook the beginning of her menopause for a beginning pregnancy.

The precarious character of these cases and the peculiar situation with which the unsuspecting practitioner may find himself confronted is well illustrated by one of Jung's cases, a truly sensational incident rather than a commonplace clinical observation.

A married woman, thirty-two years of age, with one child of eight years and a history of instrumental delivery on account of a contracted pelvis, feared she was pregnant again when a very scanty menstrual period appeared after illicit relations. On account of the husband's impotence there had been no connubial intercourse for several months, and the distressed wife sought the aid of the family physician. In consideration of her very difficult labor and for other reasons he is said to have consented to an interruption of her supposed pregnancy. Intrauterine injections applied with this object were not followed by the desired menstrual flow but by a severe

febrile illness lasting several weeks until the patient landed in the hospital with left-sided parametritis.

Examination showed the uterus to be encased laterally and behind in masses of thickened exudate. The fundus barely enlarged could be palpated through the anterior vaginal vault. There was no rise in temperature. The treatment consisted in rest in bed followed by measures calculated to abort the exudate which at the time of her discharge from the hospital some weeks later had nearly disappeared. The uterus was not enlarged.

A survey of the literature shows that the morbidity as well as the mortality is very high after attempted criminal abortion when the uterus is empty. In all of sixteen cases collected by Percheval in France these manipulations led to more or less serious sequelæ and six young women died as the result of the interference. Five of fifteen corresponding cases collected by Neugebauer likewise proved fatal. The principal cause of death is infection leading to peritonitis. The results of all *such interventions on a nonpregnant uterus are apt to be especially grave* for a number of reasons. In the first place the more or less drastic maneuvers are persisted in because the woman naturally watches in vain for the expulsion of the product of conception. Inefficient intrauterine injections are followed by others more copious or concentrated but equally inefficient. Becoming desperate the anxious woman tries to introduce some instrument such as a catheter, hair pin or knitting needle into the uterus, usually without the slightest precaution and in utter ignorance of the anatomical relations.

The natural results of such violent measures are more or less serious lesions of the genital passages from the vaginal walls to the fundus uteri. From these damaged tissue surfaces the toxic solutions used in the injections often become absorbed resulting in mercurial and other poisoning.

The absence of the ovum is an important cause of trouble in these cases. Under the existing conditions the uterine wall itself is directly damaged and infected whereas in abortion, as a rule, the part to become first infected is the ovum, in which the infection may become localized so that it disappears with the ovum itself.

Perforation of the empty uterus is a far from uncommon result of these criminal procedures. Aside from perforations of the uterus and lesions of the vaginal culdesac, instruments used in this manner may create false passages through the uterine cervix. Infectious peritonitis is the most common cause of death. The formation of periuterine hematocoele and rectovaginal fistula has also been reported after abortifacient procedures in nonpregnant women.

An illustrative case of this kind was reported by Gunnar Nystrom in 1901 ("Engström's Report from the Gynecological Clinic in Helsingfors"). A young woman who had been delivered of a child three months previously, erroneously believing herself to be again pregnant made an attempt to commit an abortion by pushing a blunt irrigating tube into the uterus. This manipulation caused profuse hemorrhage from a rupture in the deeper portion of the vagina. The wound was sutured and the patient made a good recovery.

In a remarkable observation reported by Markovicz, a rubber catheter 30 cm. in length was extracted from the paravaginal tissue nearly four months after it had been inserted for the purpose of inducing an abortion by a multipara of forty-two years whose fear of pregnancy was entirely groundless.

Jung observed a young woman twenty-two years of age who had not menstruated since the birth of her last child four months previously and in the unfounded fear of another pregnancy injected a soap solution into the uterus using an ordinary syringe with a long rubber nozzle. Instead of entering the cervix the nozzle entered the bladder and perforated the vesical wall. The patient died of sepsis and the autopsy showed a perforation orifice leading into a wide pus cavity between the bladder and the symphysis. This cavity extended on both sides along the external pelvic wall, to the lower pole of the two kidneys, communicating also with the cecum. *The uterus was free from macroscopical or histological changes indicative of pregnancy.*

A young woman of twenty-six years from Percheval's collection after waiting thirty-three days in vain for the appearance of the menstrual flow gave herself several intrauterine injections of a 1 per cent. bichloride solution. According to her own statement about 10 liters were injected. Violent pains supervened and she was sent to the hospital with all the symptoms of mercurial poisoning. On the next day patient died. *The autopsy showed a small soft empty uterus with a normal mucosa.*

In another case of Percheval's, a multipara of thirty-nine years came under observation for a discharge of pus from the vagina claiming to be four months pregnant. Examination showed a nonpregnant uterus in the normal position. A foreign body was felt in the rectum and was extracted in form of a hard rubber catheter 21 cm. long, rolled up and imbedded in fetid pus. Presumably the catheter had been broken off in the womb and had ulcerated through the mucosa and the uterine wall gradually forming an abscess in the parametrium which opened into the rectal ampulla.

A few words now about ectopic pregnancy and attempted abortion.

In the early weeks of *ectopic pregnancy* abortifacient measures and criminal manipulations are naturally very dangerous, as they are apt to lead to rupture of the membranes resulting in death from hemorrhage or infection. Neugebauer recently called attention to this phase of attempted criminal abortion in the presence of extrauterine

gestation quoting several illustrative cases. Four observations were reported by Guerdjikow, including one in which the self-inflicted traumatism resulted in tubal abortion, the patient's life being saved by laparotomy. In another case the performance of laparotomy failed to prevent the woman's death from peritonitis.

Hirsch in 1912 reported four cases of ectopic pregnancy interrupted by abortifacient procedures on the part of the women, all of whom recovered. One patient, a para-iii of twenty-seven years, had submitted to intrauterine irrigations by a professional abortionist. About three weeks later a very painful freely movable tumor of the right adnexa was found, the size of an apple. The uterus itself was not enlarged. At the end of another week a profuse hemorrhage called for immediate operative interference; the right tube was found to be swollen and adherent to its surroundings. In loosening the adhesions an embryo of 2.5 cm. came into view.

In a similar case in which the patient admitted having given herself an injection into the uterus some days previously, an operation was performed under the diagnosis of hematosalpinx and tubal abortion. The right tube was found to be transformed into a hydrosalpinx the size of a thumb and the left tube contained an embryo 0.7 cm. in length.

Cases of this kind are not always made the subject of an article but may be found scattered in the reports of society meetings. Mainzer in a meeting of the Berlin Gynecological and Obstetrical Society, Jan. 10, 1908 reported a case operated upon by him in which tubal pregnancy was discovered on one side while the broad ligament on the other side contained a hematoma which had been produced through an injury inflicted with a knitting needle.

An unusual observation in a case of attempted abortion in the absence of uterine pregnancy is that of Falgowski. The woman in the belief that she was pregnant introduced a pointed lead pencil into the uterus. Symptoms of peritoneal irritation followed in form of fever and intestinal obstruction. Under the diagnosis of ruptured tubal pregnancy, laparotomy was performed and the pregnant tube was removed. A perforation of the uterine wall was discovered posteriorly near the fundus. The young woman recovered.

Percheval's collection of eighteen observations upon women who attempted to arrest nonexisting pregnancies includes the case of a primipara of twenty-six years who about a fortnight after submitting to criminal manipulations was suddenly attacked by severe pain in the right iliac fossa and syncope. Examination led to the diagnosis of ruptured tubal pregnancy and intraperitoneal hemorrhage. Laparotomy was performed and showed a rupture of the right Fallopian tube in its ampullary portion. The ovum which presented itself in the rupture just about to burst contained an embryo of about six weeks.

Peralta Ramos in Buenos Ayres observed a woman of thirty-two years who after seven normal births caused her uterus to be catheterized by a midwife on three occasions after missing the first, second



and third menstrual periods. The last intervention was followed by pain in the lower abdomen with discharge of blood and shreds. A week later she was admitted to the hospital with symptoms of peritonitis and after another week an irregular tumor became demonstrable in the left iliac fossa. Laparotomy was performed and showed an encapsulated cavity from which pus and purulent blood clots escaped and although no fetus was found a placenta adjacent to the left tube was discovered and removed. This patient recovered. In a similar case, however, observed by Jung death occurred from septic peritonitis and general sepsis, following curettage for incomplete criminal abortion. The autopsy showed the existence of a right-sided tubal pregnancy.

According to Hammer thirteen cases of attempted criminal abortion in ectopic pregnancies had been reported up to 1914 to which he adds three personal observations all concerning abortions of the first two months. In two cases mechanical interventions had been adopted while one patient had taken a so-called menstruation powder to bring on the menstrual flow.

A case of attempted abortion by means of medicinal agents (quinine, hydrastinin and ergotin) in the presence of extrauterine pregnancy was reported by Rosenstein at a meeting of the Breslau Gynecological Society April 29, 1913. This woman a para-v of thirty-one years recovered after the removal of the enlarged right tube which was found to contain a blood clot with a central cavity the size of a pigeon's egg, lined with amnion.

The coincidence of extrauterine pregnancy and attempted abortion has thus been shown to be far from uncommon. It is naturally favored by the usual institution of these illegal procedures soon after a missed period, rarely later than the second "skipped" period. At this time the ectopic gestation is still undiscovered, but the tubal rupture or tubal abortion usually follows more or less promptly after the interference, and the physician first sees the patient under a clinical picture equally suggestive of pyosalpinx and interrupted ectopic pregnancy. The swelling of the adnexa is likely to be interpreted as the local expression of the infection with which these criminal manipulations are always associated.

A few words might be said here about the *legal aspects of cases of intended criminal abortion in nonexistent pregnancies*. The wording of the corresponding sections of the Penal Law of the State of New York is ambiguous and therefore in need of an improved and unmistakable redraft. Whereas the old statutes of 1872 and 1880 distinctly provided that the woman must be pregnant in order to fall under the meaning of the law, the omission of the word "pregnant" in the present statute is interpreted by some lawyers as a clear indication of the lawmaker's purpose to include all women

whether pregnant or not under the statute. Other lawyers contend that unless the woman is pregnant defendants indicted for attempting an instrumental interruption of a nonexistent pregnancy may not properly be convicted either of the crime of accomplished or intended abortion.

Aside from the existence or nonexistence of pregnancy further doubts arise in regard to the question of guilt incurred by a person who employs measures falsely believed by him or her to be efficacious for the production of abortion on a woman falsely believing herself to be pregnant.

An attempt to commit a crime is defined by the Penal Law (Section 2) as the performance of any act which tends but fails to effect the commission of the crime. It is, therefore, contended that if the woman be not pregnant the performance of any act (under subdivision 2) could not possibly tend to effect the commission of the crime of abortion. (The section in full reads: "A person who with intent thereby to produce the miscarriage of a woman, unless the same is necessary to preserve the life of the woman or of the child with which she is pregnant, uses or causes to be used any instruments or other means.")

The laws of Germany, Austria and Belgium punish attempted unaccomplished abortion with imprisonment for some months to a year. In Germany, in October, 1910, a young girl of eighteen years whose interference was limited to drinking a tumblerful of hot spiced wine credited with abortifacient properties, was accused of attempted abortion and sentenced to jail for ten days although upon examination she was found never to have been pregnant. This case is far from being the only one in which the courts have punished attempts at producing abortion in nonpregnant women, also when these attempts were made with inadequate means.

But to return to the medical standpoint, the morbidity and mortality in these cases of attempted abortion in the absence of uterine as well as in the presence of ectopic pregnancy are so considerable as to demand greater attention on the part of the gynecologists as well as general practitioners than this matter has been accorded in the past.

No reference to these important cases is to be found in text-books of gynecology and obstetrics nor in works on forensic medicine and the author hopes, therefore, that the illustrative material gathered from the literature in connection with his personal observation, will be sufficient to arouse a more active interest in this subject.

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11 EAST SIXTY-EIGHTH STREET.

AN ANALYSIS OF THE VAGINAL FLORA  
IN LATE PREGNANCY.

BY

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THE importance of bacterial infection in the complications of pregnancy and the puerperium has led to many studies of the vaginal flora from almost as many and widely varied angles. Special organisms of particular pathogenicity have been exhaustively investigated, in addition to numerous researches of a more general character. Much labor has been expended upon the determination of the bactericidal effect, reaction, chemical character and other qualities of the vaginal secretion itself. And with all this, the question of the nature and mode of infection remains, at least in some degree, a vexed one. The streptococci, perhaps more than any other single group, because of their well-known importance in puerperal fever, have interested many; but as the investigations of this subject have not been entirely satisfactory, a routine study of vaginal cultures during the later weeks of pregnancy was undertaken, not to isolate only streptococci but rather to determine the characteristic flora of the vagina at a particular period by the methods at our command in a laboratory for routine clinical bacteriology.

The work was done during 1915-16 while the writer was resident pathologist at the Elizabeth Steel Magee Hospital. The pregnant women of the obstetrical wards, as well as those visiting the outdoor clinic prior to admission were available. The 130 cases were not selected in any way. They included simply the ordinary run of patients, both before and after admission to the hospital. All were apparently healthy, though the amount and character of vaginal secretion varied somewhat. In none was there evidence of an inflammatory process.

A brief historical review of the study of vaginal bacteriology is of interest. Doederlein's monograph, published in 1892, was the first systematic attempt to work out the important question of the normal vaginal flora. In it, he described the large Gram positive, facultatively anaerobic bacillus which bears his name, and noted its frequent association with a type of blastomycetes which he believed

to be the *saccharomyces albicans* or thrush fungus. Next in order of frequency in his cultures was the *staphylococcus albus*. Gonner, in 1887, described many organisms in vaginal smears, mostly bacilli. He believed that the vaginal secretions contained no pathogenic bacteria. Bumm also supported this view, while Winter believed that they were present in a state of lowered virulence, or even were without virulent qualities. Doederlein, in 195 cases, found streptococci in only eight. In inoculation experiments, but five of these were demonstrated to be virulent. Krönig, in 1894, published a series of 200 bacteriological examinations, in which, aside from the gonococcus and the thrush fungus, he found no pathogenic microorganisms. He found no streptococci. On the other hand, Joeten, in 1912, reported 100 antepartum cultures, with streptococci in 67, and 14 of these were hemolytic. In these cases, evidence of pathogenicity was wanting. Max Stolz, in 1903, published a report of a small series of pregnant women in which bacteriological examinations had been made. He divided his cases according to Doederlein's classification of normal and abnormal vaginal secretions. He then preceded to show that practically the same number and types of bacteria could be cultivated from both groups. These bacteria he was satisfied to name as cocci, bacilli and streptococci, without entering further into their nature than to say that the streptococci were facultative anaerobes, and were pathogenic for white mice. Berg-holm, in a series of 40 cases, noted the constant presence of bacterial forms in the vaginae of pregnant women. These he was able to obtain in anaerobic cultures. He also found *saccharomyces* in 16 out of 40 cases, though these were never seen in direct smear. Krönig found *oidium albicans* in 22 out of 167 cases studied. Walton and Medalia, working on streptococci in the vagina, found them present in from 10 to 40 per cent. of pregnant women. They reported extensively on the hemolytic and nonhemolytic forms without, however, differentiating them further. Küster, writing on the bacteriology of the normal vagina, concluded that the bacteria of the vagina were almost entirely saprophytic and nonpathogenic and were at least facultative anaerobes. True pathogenes, he states, are only present when there is an abrasion or wound of some sort, in which they are able to carry on their parasitical existence. Such organisms are only able to continue in this region by resisting the antagonistic symbiosis of the saprophytic flora, the high degree of acidity present, the relative anaerobiosis, the phagocytic properties of leukocytes, and possibly the immune properties of the fluid portion of the normal vaginal secretion. These are problems which will not

be discussed in the present study. In addition, the pyogenic staphylococci, pneumococci, the colon bacillus, the gonococcus, the Klebs-Loeffler bacillus, diphtheroid bacilli, tubercle bacilli, smegma bacilli and various anaerobic saprophytes have been reported in vaginal cultures.

From the data enumerated, the remarkable absence of definite identification of the bacteria isolated is striking, and with this in mind, the present study was undertaken. Particular interest was felt in the streptococci, both hemolytic and nonhemolytic types. The importance of determining as completely as possible the biological characters of these organisms, including their reactions on various sugar media was fully realized, in view of the fact that the streptococcus pyogenes could thus be identified from other hemolytic forms. The nonhemolytic streptococci were also completely identified by their sugar reactions, and gave in some measure, a clue as to the source of these organisms. In working out the streptococci the classification of Holman was followed. The staphylococci and the Gram negative bacilli were also identified according to the accepted methods, and other organisms were worked out as far as routine methods would permit. The cultures were obtained from women between the twenty-fourth and fortieth week of pregnancy, according to obstetrical calculations. A few were earlier, even before the diagnosis of pregnancy was fully established, and several cases were past the estimated date of confinement. As stated above, all were apparently normal cases, without elevation of temperature or local inflammatory reaction in the vagina.

The material for culture was obtained before any procedure other than a thorough cleansing of the external genitalia. A sterile speculum was introduced and opened so as to expose the vaginal vault and posterior culdesac. Free access to the vaginal vault being thus obtained, a slender wooden applicator bearing on its tip a small cotton swab was removed from the stoppered test-tube in which it had been sterilized, and introduced directly into the highest portion of the vagina, where a sample of the secretion in the region about the cervix was obtained. After being replaced in its tube, the swab was immediately taken to the laboratory. The original cultures were planted as soon as possible after receiving the swab. The usual laboratory routine was followed in this regard. The swab was first shaken in dextrose serum broth and then in plain broth. These fluid cultures were incubated at 37.5° C. for eighteen to twenty-four hours. Direct smears for staining were made from the same swab; but in any instance in which the presence of gonococci was suspected,

a separate swab was sent for smear preparations. The smears were stained routinely by Gram's method. Following incubation, the fluid cultures were examined by inspection and smear for evidences of growth, and if in the least suggestive, they were plated on human blood agar, using the streak method. These plates were incubated for a similar interval, and again inspected. The various types of colonies were identified by their gross appearance and by stained smears. Discrete colonies of the type or types present were then transferred to media suitable for isolation in pure culture, prior to complete identification.

In the identifying streptococci, the original character of hemolysis or nonhemolysis was again tested by transfer to a blood agar slant. After twenty-four hours' growth to develop this quantity, transplants were made to a set of four sugar serum broths, including lactose, mannit, salicin and inulin. These were incubated and observed daily for at least a week, during which time a record of rate of growth, acid formation and capsule development was kept. This method also identifies the pneumococci.

The Gram negative bacilli were differentiated by the ordinary media used in distinguishing the members of the typhi-coli group. This included four plain sugar broths, dextrose, lactose, saccharose and mannit (all containing Andrade's indicator and put up in Durham's tubes), agar, litmus, milk, Dunham's peptone solution for indol formation, and gelatin. Motility and the presence of capsules were routinely studied. Besides identifying the members of the typhi-coli group, this method of study made it possible to distinguish several Gram negative saprophytic bacilli.

Staphylococci were grown on plain agar as the best medium for obtaining a characteristic growth, with the development of color after several days. After twenty-four hours' growth on agar, transfers were made as stab cultures in deep gelatin, which were observed daily for liquefaction.

The findings in direct smear may be tabulated as follows:

No definite organisms (although all but one of these produced growth in cultures.....	13
Gram positive cocci alone.....	11
Granular fusiform bacilli and short Gram positive bacilli.....	1
Gram positive bacilli and Gram positive diplococci.....	9
Diphtheroid bacilli and Gram positive coccoid forms.....	2
Gram positive diphtheroid bacilli alone.....	19
Barred, granular, fusiform Gram positive bacilli alone.....	1
Small Gram positive bacilli, often in diploforms.....	6
Gram positive bacilli, not further described.....	1

Gram positive bacilli, of fair size with square ends.....	17
Gram negative bacilli, large Gram positive bacilli and diphtheroid bacilli.....	2
Gram negative bacilli, large Gram positive bacilli and Gram positive diplococci.....	1
Gram negative bacilli and large square ended Gram positive bacilli.....	2
Gram negative bacilli and Gram positive coccoid forms.....	12
Gram negative bacilli alone.....	31

It will be seen that these findings covered a fairly wide range of organisms and that the cultural findings, which appear below, are at considerable variance with the direct smears. Absence of organisms in direct smear was reported in thirteen instances; but in all but one of these, one or more types were obtained culturally. Where only Gram positive coccoid forms were seen in smear, there was no constancy in finding cocci culturally. The same is true of the other types of organisms seen in apparently pure culture in direct smear. Cultures frequently gave evidence of other organisms in addition to those seen in smear, and as often an entirely different type. In cases showing several forms in direct smear, the final results were even more widely variable. The prominence of various Gram positive bacilli in direct smear, notably those described as "diphtheroid" and the large form with square ends is in sharp contrast to the cultural findings. The growth of these forms was almost uniformly unsuccessful although Loeffler's blood serum was used in addition to the other media in original cultures when diphtheroid forms appeared in the direct smears, and various anaerobic methods were employed in an attempt to recover the large Gram positive bacillary forms. One diphtheroid form was obtained in a pure, but feeble growth and its exact nature was not determined. None of the large square-ended bacilli were ever grown. The anaerobic methods included (1) a variety of media cultivated in anaerobic jars, (2) deep agar with and without a covering layer of sterile albolene and (3) litmus milk overlaid with albolene. Here it is to be noted that Krönig and Menge were able to grow the bacillus of Doederlein only on acid media, where it grew apparently equally well both with and without strict anaerobic conditions. Bergholm, however, did in one instance succeed in obtaining a culture of what he believed to be this organism on an alkaline medium. The preference of this organism for acid is likewise demonstrated by Krönig's results in studying the vaginal bacteriology of pregnant and nonpregnant women. He found that in 55 per cent. of vaginal cultures in pregnant women he was able to obtain *B. Doederleini*, while only 13



per cent. of similar cultures in nonpregnant women yielded this organism. This finding may be attributed to the greater acidity of the vaginal secretion in pregnancy. These points possibly indicate why the large, rather square-ended Gram positive organisms so frequently seen in smears were not obtained in culture, since the media used was neutral in reaction to litmus.

The results in cultures showed, in the 130 cases, no growth in twelve instances. Of these twelve, all but one had shown various bacteria in direct smear. In these smears, various Gram positive bacilli, mainly the large square-ended form, were found in nine instances. Beside the one showing both no organisms in smears and no growth, one showed Gram positive diplococci, and one Gram negative bacilli. From the remaining 118 cases, Gram positive cocci, including many varieties were grown 127 times. Gram negative cocci were found but once. Gram positive bacilli were grown nine times, and Gram negative bacilli seventeen times. Blastomycetes were grown nine times, an anaerobic streptothrix once and a member of the nocardia group once.

After this general survey of the cultural results, the findings are next indicated in greater detail. The cocci constituted the largest group, and may be subdivided as in the following brief tables.

#### Staphylococci.

Staphylococcus albus (air form).....	2
Staphylococcus pyogenes albus.....	85
Staphylococcus pyogenes aureus.....	9

#### Hemolytic streptococci.

Streptococcus pyogenes.....	3
Streptococcus hemolyticus infrequens.....	1.
An unidentified hemolytic streptococcus.....	1

#### Nonhemolytic streptococci.

Streptococcus salivarius.....	5
Streptococcus fecalis.....	3
Streptococcus mitis.....	7
Streptococcus equinus.....	1
Streptococcus ignavus.....	2
Streptococcus nonhemolyticus.....	1
An unidentified nonhemolytic streptococcus.....	1
Pneumococci.....	4

And in addition the diagnosis "streptococcus only" was made in two instances, in which the organism was found in original cultures but died out before it could be isolated.

The Gram negative cocci included only one micrococcus resembling micrococcus catarrhalis. This organism did not grow satisfactorily, and could not be completely identified. The absence of gonococci in the series of cases studied is remarkable. In no instance was a direct smear suggestive enough to warrant an attempt at obtaining the organisms culturally.

Among the bacilli, the various members of the typhi-coli group were found much less frequently than might reasonably be expected. *B. coli communis* was found in ten instances, *B. coli communior* in three, while *B. lactis aerogenes* was isolated but once. In addition to the above Gram negative bacilli, one instance of *B. proteus* and two of saprophytic chromogenic bacilli remain to be mentioned. The Gram positive forms included one diphtheroid bacillus and five instances of *B. xerosis*. Although blood serum was inoculated from the original swab whenever diphtheroid organisms were seen in direct smear, no true *B. diphtheriæ* was grown.

Of the spore-bearing Gram positive bacilli only one member was isolated, identified as *B. mesentericus*. Finally, one chromogenic saprophytic Gram positive bacillus, and one poorly growing Gram positive anaerobic bacillus complete the list.

The marked difference between the findings culturally and in direct smear of bacilli broadly classed as Gram positive is interesting. Whether or not the organism last mentioned is to be considered an example of Doederlein's bacillus, one is unable to say, as it grew feebly and did not persist in cultures long enough to give an opportunity for study. The cultural and biological characteristics of the so-called Doederlein's bacillus are described as follows by Migula: "A medium-sized bacillus, rather slender; grows in 1 per cent. glucose broth. When transferred to glycerin agar it produces dewy, drop-like colonies. It is a facultative anaerobe." The description does not specify that an acid medium is essential, though this has been definitely stated by various workers, who have also noted that better results are obtained by employing a considerable amount of the secretion in the cultures. Our cultures were not made on acid media and only a relatively small amount of secretion was used. The consensus of opinion, too, is that of all the vaginal organisms this is the most saprophytic. Hence, less interest was felt in its cultural differentiation. The others, particularly the streptococci were of greater importance and interest. If the large Gram positive bacilli often seen in direct smears were this organism, it is not so remarkable that they were not obtained culturally, in view of the fact that media having a reaction suitable

for this organism was not employed, and only a small quantity of secretion was used in making the original cultures.

Blastomycetes were isolated in nine cases. These organisms were typical yeast forms staining strongly Gram positive. They gave somewhat different reactions on plain sugar broths in Durham's tubes, such as are used for the typhi-coli group. Of the nine strains isolated, one fermented only dextrose, forming acid and no gas; five fermented dextrose, with the formation of acid and gas; and three fermented both dextrose and saccharose, with the formation of acid and gas. All forms produced their reactions slowly and neither acid nor gas were produced in very great amounts. The organisms were not grown on special media for spore formation. The single instance of streptothrix was isolated in pure culture from a case which had shown long, Gram positive, granular bacillary forms, square ended and sometimes in pairs in direct smear. The nature of the organism was not further determined.

One member of the nocardia group was also isolated in pure culture, but its exact identification was not completed. The direct smear in this case showed Gram positive bacilli, Gram positive diplococci and Gram negative bacilli. In the culture a staphylococcus albus was also obtained.

The foregoing findings indicate that the vaginal flora is extremely variable. The types of organisms most resistant to acid among the ordinary pathogens are the streptococci and the typhi-coli group. Küster comments on the predominance of "acidophile" organisms in the vagina. Both of these groups produce acid in their growth on media, and in the case of the streptococci, Broadhurst has been able to recover viable organisms from media which showed an acidity as high as 5.3 per cent. The blastomycetes are also capable of flourishing in an acid medium. Hence, it is noteworthy that, after the staphylococci, large numbers of which were cultivated, as would be expected from moist skin or mucous surfaces, the next three in order of frequency were the streptococci(26), the colon bacilli(14) and the blastomycetes(9). Doederlein gave the acidity of the vaginal secretions as 0.4 per cent. lactic acid, and believed it to be somewhat increased in pregnancy, while recently Harada has shown that in pregnancy this reaches 0.9 per cent., and that the bactericidal effect is definite. The determination of the carbohydrate reactions of the streptococci was felt to be particularly important in view of the dearth of any definite information on this point in the literature. Walton and Medalia, in their extensive research on streptococci in the vagina, both ante- and postpartum, were content to classify

them as hemolytic and nonhemolytic, discarding the carbohydrate reactions as valueless apparently without having tried them out. They also stated that the determination of virulence by animal inoculation is of no avail, because of the great variability of factors concerned. Henrici, on the other hand, believes that carbohydrate reactions do not necessarily indicate virulence, basing his views on a long series of streptococci studied by their reactions on the carbohydrates and paralleled by the results of animal inoculations. Doederlein and Winternitz refer to the streptococci simply as "streptococci," without any further differentiation. Stolz, also, classified these organisms merely as streptococci. Schottmüller mentions an anaerobic streptococcus which he calls the "streptococcus putridus," and also speaks of the streptococcus of erysipelas. Seligmann divided the streptococci as hemolytic and nonhemolytic. He found the percentage of hemolytic streptococci low, and stated that the finding of streptococci seemed to have no prognostic value as to the progress of the case postpartum. Joeten likewise used only the presence or absence of hemolysis to differentiate streptococci, finding hemolysis no criterion of virulence. He believed that the presence of streptococci in the vaginal secretions was without prognostic value. Varello, working on cervicitis and endocervicitis, found streptococci which he was able to grow both aerobically and anaerobically and on both acid and alkaline media. These showed pathogenicity for white mice, and differed in no way from "streptococcus pyogenes." Koblanck recovered many streptococci from vaginal cultures, but was quite unable to differentiate between streptococcus pyogenes and the less pathogenic forms. Natvig, too, comes to the same conclusion. He was able to differentiate the streptococcus pyogenes from an organism he terms the anaerobic streptococcus of Krönig. Being unable to go further, he was led to classify the remaining streptococci as atypical pneumococci, or "parapneumococci." Confusion with green streptococci doubtless was the cause of this error.

In the 130 cases studied, streptococci were never seen as such in direct smear, and only twenty-six strains were recovered culturally. Only three of these gave the carbohydrate reactions of streptococcus pyogenes, and as animal inoculations were not carried out, the virulence of these strains is not known. While the carbohydrate reactions may not be strictly indicative of virulence, they are undoubtedly of value for classification.

The routine conduct of obstetrics at Magee Hospital permits as

few vaginal examinations as possible, particularly in late pregnancy. In none of the cases studied was there any serious complication following delivery. Slight rises of temperature were noted, but in these cases blood cultures invariably proved negative.

*Conclusions.*—A study of the vaginal flora in pregnancy carried out according to the ordinary modern routine laboratory methods, reveals a variety of organisms, and various definite strains of each and is of particular interest in regard to the types of the streptococci and the organisms of the typhi-coli group.

A relation apparently exists between the ability of various groups of organisms to flourish in an acid medium, and the presence of these organisms, notably the streptococci, the members of the typhi-coli group, and the blastomycetes, in the vagina.

The presence in the vagina of streptococci giving the carbohydrate reactions of virulent organisms, as well as those of less virulent character but corresponding to forms recognized as having definitely invasive qualities, is comparable to that recognized in the other cavities, in which virulent or apparently virulent organisms are constantly present without giving rise to disease processes.

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MICROBIC FLORA IN THE PARTURIENT VAGINA AND  
THE MOUTH AND RECTUM OF THE NEWLY  
BORN; WITH REMARKS ON SEPSIS  
NEONATORUM.\*

BY

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ALTHOUGH puerperal sepsis is rare in modern maternities, sepsis in the newly born, in its varying degrees, is quite common even in the best institutions. Modern strict asepsis certainly guards the mother, but we must not forget that Nature also contributes its share in this protection. It has long been taught that a self-purification takes place in the vaginal mucus of the parturient woman, with the result that pathogenic microorganisms present therein lose more or less of their virulence. (As will be seen later this claim seems to have lost much of its force as a result of recent experiments.) According to Krönig pyogenics such as *B. pyocyaneus*, staphylo- and streptococcus artificially introduced into the vagina of a pregnant woman disappear in from six to thirty-six hours.

The newly born infant, however, has an insufficient capacity for the manufacture of immune bodies and as a consequence has a lowered resistance toward septic infection, which may be antenatal, intrapartum or postnatal. During intrauterine existence the source of infection may be the placenta or liquor amnii. Infection intrapartum may also be endogenous, as well as exogenous; should the parturient canal contain virulent bacteria, the child may be infected at several ports of entry, the most common being the umbilicus (in which infection extends to the liver along the umbilical vein); while next in frequency come the skin, and mucosæ of the buccal cavity, lungs, gastroenteric tract, eyes, ears, etc. Many cases of sepsis neonatorum are cryptogenetic, no port of entry of virus being discoverable.

Postnatal infection is common in institutions because of poor hygienic conditions. The infants are usually handled by inexperi-

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enced nurses; while the visiting obstetrician, too busy with the mother, does not give sufficient attention to the child. When the pediatricist is consulted, the case has usually become hopeless.

In reviewing the literature of the subject there is a notable absence of uniformity of findings. The confusion is increased by the fact that both French and German writers quote only their own countrymen. The customary method of procedure is to compare the flora of the mother's vagina with that of the infant's mouth, vagina, and rectum. Identity of bacteria is proved both by ordinary microscopical technic and cultures.

Von Reuss(1) cites hardly any authorities, but makes the claim that in the newly born (exact age not given) staphylococci are invariably present in the infant's mouth and mother's vagina, the streptococci being less frequently found. He gives many facts but to have value in the present connection the findings should be limited to the first day after delivery, or before the infant's mouth can be contaminated from outside sources.

The German literature on the subject is well summed up by Grete Schmidgall (Professor Fehling's Strassburg Clinic)(2), who also reports the results of personal studies. As authorities she quotes Kneise(3), Schalk and Knapp. The former investigated the newly born immediately after delivery for the presence of mouth bacteria. He also made control tests during later periods and reached the conclusion that 100 per cent. of infants are born with bacteria in the mouth. The staphylococcus aureus greatly predominated over the streptococcus.

Schalk about the same time found a definite association between the presence of *B. coli* in the maternal vagina and infant's vagina (about 33½ per cent.).

A still earlier observer, Knapp(4) who had devoted many years to these studies, found a necessary connection between the bacterial flora of the vagina and intestine in the newly born.

Schmidgall herself studied a series of newly born in respect to the flora of the mouth. An extremely elaborate technic was used. As a rule, the buccal secretions were sterile until the second day; this holds good throughout for streptococci. In a very few cases hemolytic staphylococci were found a few hours after delivery in the child's mouth as well as in the mother's vaginal secretions during labor. She concludes that in the majority of cases (ten out of thirteen) the mouth of the newly born is sterile at birth; the vaginal flora in the newly born girl depending upon the vaginal flora of the mother. The germs thus present are usually pathogenic,

and the acid reaction of the vagina cannot inhibit their growth. Intestinal flora exert but little influence on vaginal flora.

The work of French authors is summed up along with original research in a paper by Mme. Brailowsky-Lounkevitch(5). She studied the material of the Tarnier clinic under Brindeau, and Metschnikoff himself. Her predecessors comprise Campo, Bonnaire and Keim, Lewkowicz and Jeannin. These men have shown that at birth the buccal fluid of the newly born is absolutely sterile. Jeannin showed that toward the sixth hour of the first day, bacteria begin to appear and by the tenth hour they may be cultivated. The staphylococcus is the first to appear and forms the most numerous contingent. While some tests were made a few hours after birth, evidently confirming the conclusion of her predecessors, this author is chiefly interested in studies at a more advanced period. She appears to endorse the finds of Jeannin.

Dr. R. M. Smith(6) of Boston was able to make cultures from the vagina of an infant six hours old and from others within the first day of life. He mentions that staphylo- and streptococci were present together, but most of his subjects were evidently much older than one day.

A word about the meconium. While Passini (cited by Von Reuss), and doubtless others, have found it sterile at birth and up to twenty-four hours later, others have had the reverse experience and have found much bacterial flora during this period.

The authors have made independent studies along these lines, and in the absence of knowledge of the work of others. They were interested in the subject of the flora of the parturient vagina and also of the flora of the mouth and meconium of the newly born in the first day of life. The technic for obtaining secretions was as follows: prior to scrubbing the maternal genitals for delivery a sterile swab was introduced about 1 inch into the vagina, and a serum-glucose-agar medium contained in a sterile Petri dish was duly inoculated. As soon as the baby was born a separate sterile swab was passed into the mouth and a separate one into its rectum and inoculated into the same medium, contained in a different Petri dish and carefully labelled. The results of this research are herewith tabulated; the tables contain four parallel columns which indicate respectively the name of the mother and the finds in the maternal vagina, baby's mouth and meconium.



TABLE SHOWING RESULT OBTAINED FROM CULTURES

No.	Mother's name	Vagina	Baby's mouth	Baby's rectum meconium
1	Baumgarten	Staphylococcus aureus	No growth	No growth
2	Tracewar	No growth	No growth	No growth
3	Diamond	No growth	No growth	No growth
4	Schurmer	No growth	No growth	No growth
5	Pomeroy	No growth	No growth	No growth
6	Meritt	No growth	No growth	No growth
7	Levy	No growth	No growth	No growth
8	Gebelberg	No growth	No growth	No growth
9	Kosanoff	Staphylococcus aureus	Staphylococcus aureus	Staphylococcus aureus
10	Jacobs	No growth	No growth	No growth
11	Kern	No growth	No growth	No growth
12	Berg	No growth	No growth	Not taken
13	Chasphion	No growth	No growth	No growth
14	Silverman	No growth	No growth	No growth
15	Bebnuk	No growth	No growth	No growth
16	Kats	No growth	No growth	No growth
17	Flotte	No growth	No growth	No growth
18	Glodstein	Staphylococcus aureus	Staphylococcus aureus	Staphylococcus aureus
19	Dranger	Staphylococcus aureus	Staphylococcus aureus	Staphylococcus aureus
20	Smith	No growth	Not taken	No growth
21	Weindraub	No growth	No growth	No growth
22	Myrowitz	Staphylococcus aureus	Staphylococcus aureus	Staphylococcus aureus
23	Warshill	No growth	No growth	No growth
24	Cooper	No growth	No growth	Staphylococcus aureus
25	Engel	Staphylococcus aureus and Micrococcus urea	Not taken	Not taken
26	Levinson	No growth	No growth	No growth
27	Caran	Streptococcus	Staphylococcus aureus	B. coli
28	Zimmerman	No growth	No growth	No growth
29	Rubin	No growth	No growth	No growth
30	Weinboro	Staphylococcus aureus	Not taken	Not taken
31	Fein	No growth	No growth	No growth
32	Goldfarb	No growth	No growth	No growth
33	Horowitz	Strepto. and B. coli	No growth	Streptococcus and Staphylococcus albus
34	Wiamend	Staphylococcus albus	No growth	B. coli
35	Sperman	Staphylococcus albus	No growth	Staphylococcus albus
36	Jacobson	Staphylococcus albus	Streptococcus	Staphylococcus albus
37	Mayer	Gram. and bacillus	No growth	No growth
38	Weikof	No growth	No growth	No growth
39	Bluestone	No growth	No growth	No growth
40	Finkel	No growth	No growth	No growth
41	Hess	No growth	No growth	No growth
42	Wollman	No growth	No growth	No growth

## SUMMARY.

Of 42 cases tabulated, results were positive in 16 and negative in 26. In but 4 cases were the same organisms found in the maternal passages and baby's mouth and rectum (staphylococcus 3, streptococcus 1). In the other 6 positive cases, the finds were not uniform.

In case 27, the streptococcus was found in the vagina, the staphylococcus in the mouth and the colon bacillus in the meconium.

In case 33, the streptococcus and *B. coli* and staphylococcus albus were found in the vagina and streptococcus and staphylococcus albus in the rectum with an absence of *B. coli*, and no growth in the mouth.

In case 34, the staphylococcus was found in the vagina and the colon bacillus in the meconium.

In case 36, the staphylococcus was found in the vagina, and also in the meconium, the streptococcus being present in the mouth.

In case 37, the Gram + bacillus was found in the vagina only.

#### CONCLUSIONS.

The findings of the authors are not incompatible with those of recent German and French research, and in some essential respects show close agreement (predominance of negative results on the first day of life, probable evidence of infection of infant's mouth from mother's vagina before the second day, constant predominance of staphylo- over streptococci, the former being the first to appear, etc.).

50 EAST NINETY-SIXTH STREET.

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#### RIGHT-SIDED PAIN IN YOUNG WOMEN.\*

BY

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To complete a record of the thought, and embrace it within the cycle of the year's work, let me describe a case of recent date in which the pathology was identical with that developed in a former paper on "Postpuerperal Sterility, Its Cause and Surgical Treatment."

The case was that of a young woman in the twenties, who came to me with a chief complaint of painful menstruation, with constant

\* Reported at the December Meeting of the Forsyth County Medical Society.

and marked pain in the right side. Being unmarried and a virgin, with no history accounting for the pain, save a severe attack of measles in early girlhood, she was told that she was still the victim of this infantile disease, and that the appendix and the appendages were the foci. The patient was of the "ptosis" type, of which the radiograph was confirmatory, showing a marked decensus of all viscera, with the right kidney some distance from its home in the flank. This, however, being a congenital rover, its fixation was not advised.

Believing her disturbances to be the sequellæ of her attack of measles, and that surgery only would relieve its pathology, operation was advised and accepted. Through a free right rectus incision, the appendix was easily located, and while not actively inflamed, the lumen of this "Little Assassin" was lessened, with some fixation, through a "webbed" mesoappendix to the head of the cecum, in which normal rotation was restricted by inflammatory bands. After removal of the appendix, each tube and ovary in turn was brought into view and examined. On the left, conditions were fairly normal, with fimbriæ floating free; but on the right, and confirming the feel of former examination, the fimbriæ did not float free, but were much congested and agglutinated to the surface of the ovary. Surrounding this tube and its adjacent ovary with gauze, it was gently freed from its fixation; when, finding a patulous ostium, a filiform bougie was passed through its entire lumen, only stopping when it reached the uterine cavity. Being satisfied with this, the appendage was returned to its home in the pelvis, a half pint of normal saline solution poured in, to favor the organs floating free for a while; and closure effected by interrupted through-and-through silk-worm gut sutures, with a running number two catgut in the peritoneum, deeming this more safe in the prevention of subsequent adhesions to the abdominal wall.

The postoperative history of the case was uneventful, pulse and temperature remaining practically normal throughout, with really no pain as a feature. To me, this pathology and its removal are of much interest and importance, and I firmly believe that its study and development will contribute much that is of value to the relief of right-sided pain in young women.

In addition to this, let me give further account of a clinical report offered several meetings ago of a case of "Pelvic Infection Following Abortion," in which both ovaries were spent craters, with all productive stroma destroyed, and only pus containers remaining. In this case, both sides were removed entirely, leaving the uterus intact. During the past week this patient was in my office. Her operation was in the month of September, since that time she has gained about 20 pounds in weight, feels perfectly well in every way, and for two months past has been visited by a perfectly normal menstruation, lasting from three to five days, and without pain. Thus her pathology is removed, without robbing her of one of the most important and protective functions of womanhood.

## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

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*Meeting of December 12, 1916.*

*The President, DR. J. O. POLAK, in the Chair.*

DR. LEROY BROWN presented a report of a case of

**DIFFUSE ADENOMA OF VAGINA PRESUMABLY SECONDARY TO ADENOMA  
OF BARTHOLIN'S GLANDS. SECONDARY BEGINNING  
ADENOCARCINOMA.**

Mrs. M. O'S., fifty-two years old was admitted to my service at the Woman's Hospital on September 26 of the present year. The history she gave on admission was, pain in the lumbar region and a profuse vaginal discharge, which had existed for a period of two years. Her menstruation began late, at nineteen years, and has since been regular until the menopause, which occurred in 1913. The patient has been married nineteen years and has had no children or miscarriages, also no history of venereal infection. She had a curettage in 1900 at the Roosevelt Hospital. Her present symptoms for which she entered the hospital were a profuse vaginal discharge of a mucopurulent character and odorless. This discharge was noticeable chiefly after being on her feet. The patient's general physical condition was not good and though of large frame she is however markedly anemic. She complained of a bearing down, dragging sensation in the lower portion of the abdomen in addition to the discharge. The patient still has some of the menopause symptoms. She stated that she had lost weight and strength.

The vaginal examination showed what appeared to be an indolent freely discharging patch of elevated and eroded vaginal tissue, which extended downward on the left side within 2-3 cm. of the vulva, and upward in an irregular triangular shape of some 4 cm. in width at its broadest portion to within 3 cm. of the cervix on the right side. There was a thinning out of the rectovaginal septum above the vaginal sphincter causing a marked rectocele although the patient was nulliparous.

The involvement of the posterior wall of the vagina did not appear to be of malignant character. There was, however, a section taken by the thermocautery knife from the thickest portion during the first week in October, the pathological report of the piece removed is as follows:

*Diagnosis.*—Adenoma of Bartholin's gland, located in the rectovaginal septum. Inflammatory changes in the tumor.

*Examination of Tissue.*—Two pieces of tissue obtained from the posterior vaginal wall. Frozen section shows fibrous tissue with a number of adenomatoid coils of glands and a papillated surface carrying a single row of high columnar epithelium. No signs of malignancy on frozen section.

The section shows numerous acini with round and irregular lumina, greatly dilated; some of them even cystic. The surface shows papillations with a similar high columnar epithelium. Glands show no distinct basal membrane. Round-cell infiltrations in the papillation of the surface as well as around certain acini. Small hemorrhages in the interstitial tissue. The cells themselves are high columnar with a central oval nucleus. In one section the papillary columnar epithelium is arranged in several layers along the papillary excrescences. In this part the heaping up of the epithelial cells in so many layers is not uncommon and suggests beginning malignancy.

After receiving this report the patient was kept under observation for two weeks further. While the condition had improved to some extent it was considered advisable to remove the entire vagina and uterus.

This was undertaken October 26. The vagina was incised for its entire circumference, commencing at the vulva well beyond the lower edges of the involved area. After a sufficient portion had been separated from its underlying attachments the free edges of the separated portion were brought together with stout silk ligaments, which were left long for the purpose of traction. The instruments were then resterilized and the operator and his assistants furnished with clean gloves. The dissection was continued until the vagina was separated as far as the internal os of the uterus. At this time it was found that a small opening in the rectum had been made in the thin rectovaginal septum. The operation was suspended and this opening was closed by sliding the upper tissues over the opening, uniting them to the perineal edge below. Toward the close of the dissection the anterior retractor holding up the bladder was accidentally pushed by an assistant into the bladder. On account of these two accidents it was not considered advisable to enter the peritoneal cavity. The uterus with the cervix and vagina intact representing a closed pocket was amputated at the internal os, both uterine arteries being tied. The opening of the bladder was then closed with through and through and Lambert sutures. The vagina was packed with gauze, gutta-percha tissue being interposed beyond anteriorly and posteriorly to prevent the gauze adhering to the united edge of the injured bladder and rectum.

The patient made an uneventful recovery, the rectal injury showed evidences of slight leakage for a few days after the gauze was removed. This, however, soon closed permanently. The vaginal injury continues to leak in very small quantities through a minute sinus existing to one side of the agglutinated sides of the vagina. The patient will be kept under observation and it is anticipated that

the remains of the uterus will be at a later time removed if there is any indication.

The pathological report on the specimen as a whole is as follows:

*Macroscopical*.—Cervix with the entire vagina. The cervical portion of the specimen measures 4 cm. in length. Cervix is not lacerated, shows a round external orifice. The vagina measures 12 cm. in length by 5 cm. in width. The entire mucosa of the vagina is purple red and shows a number of irregular eroded areas some of them showing a central circular depression. The tissue in the eroded areas appears granular, the underlying submucosa and the parakolpium are of normal firmness and apparently not invaded by any foreign tissue. The lower edge of the eroded portion of the vagina is represented by a rather sharp demarcation line. The surface of the vagina toward the septum rectovaginal is perfectly smooth and shows no adhesions.

These sections taken from different portions of the vagina. One from the cervix.

*Microscopical*.—Sections show a glandular mass, the tubules strongly resembling Bartholin's gland. The nuclei are at the base of the cells and the margins are clear. The greater part of the tumor is a simple adenoma without signs of malignancy. There is considerable inflammatory reaction. There were no mantles of cystogenic tissue around the tubules. Most of the sections showed this simple adenoma but these were regions where the epithelium was proliferating irregularly and the appearance was that of a destructive adenoma. There was, however, no tendency of the cells to grow freely into the stroma part of the glands. The surface shows a papillated epithelium and in places this also has the character of an incipient destructive adenoma.

#### DISCUSSION.

DR. E. SCHWARZ.—“This specimen shows a rather rough vagina surface and this indicates that the squamous epithelium which is normally present in the vagina has been replaced by some other tissue. There is an extensive proliferation of glands over the entire surface of the vagina and a few points may be mentioned in regard to their derivation. There are two possibilities; first, that the glands are of postnatal origin, or they are glands that originated from some embryonal structure. The structures that are extremely similar to the glands which we find in this specimen are Bartholin's glands. After due consideration of all the points it is hard to decide on a diagnosis. A diagnosis of an embryonal growth derived from Gaertner's duct would not be well accepted, first, on account of the character of the glands, and, second, on account of the peculiar extension. It is possible that inflammatory changes took place before the adenomatous growth. The tumor is of rather rare occurrence and so far as I know, no growth of such extent has as yet been described. It seems to me that such a neoplasm is derived from the glandulæ vestibulares and as far as I know there is no

reference to any similar growth in the literature. The question of the pathogenesis of these glandular structures is a matter of discussion."

DR. HOWARD C. TAYLOR presented a specimen of

#### DECIDUOMA MALIGNUM.

This specimen which consists of two nodules from the lower part of the vagina and the uterus and appendages removed at the subsequent operation, was removed from a woman thirty-two years of age. She had been married ten years, had had one child six and one-half years and one miscarriage three and one-quarter years previous to the time she first came under my observation. It was noted that at the time of the miscarriage this patient was curetted and apparently overcuretted, as the menstruation which previous to the miscarriage was of the thirty-day type, of seven days' duration and moderate to profuse in amount was changed to the six or seven weeks' type, of three or four days' duration and about half in amount. She had menstruated four days previous to my first examination. This menstrual period was similar to the periods since the curettage excepting the flow was of a darker color. There was only slight dysmenorrhea. Between the periods there had been no pain except occasionally a headache, there was no vaginal discharge and no disturbance with the function of the bladder.

Four days previous to her first visit to me, at the end of her menstrual period, she had noticed a nodule at the lower part of the vagina. The patient was sure that the nodule had been present only a short time and nothing of the kind was found by her family physician who had made a vaginal examination four months previously.

*Physical Examination.*—On each side of the vagina a little higher than the Bartholinian gland was a nodule, the one on the left side was the size of an English walnut, the one on the right somewhat smaller. The uterus was slightly increased in size, there was no laceration of the cervix, there was nothing found in either appendage.

*First Operation.*—The patient was admitted to the Roosevelt Hospital and the two nodules removed and the wounds closed. No curettage was done as the menstruation had already been diminished by the previous one.

*Microscopic Examination.*—The tumors were composed largely of blood clot and the first diagnosis made was fibroangioma but this was changed later to chorioepithelioma.

A careful physical and x-ray examination of the chest was made but no metastasis could be detected in the lungs. It seemed, therefore, that a complete hysterectomy was justifiable. This was done about two weeks after the first operation. It had been suggested, that as there were no uterine symptoms, and as the patient was a young woman, that it would be better to first curet the uterus and determine the necessity of an hysterectomy by the nature of the curetings. An examination of the uterus after the removal demonstrated that such a course would not have given a correct diagnosis

of the condition as the malignant growth was nowhere in direct contact with the endometrium but entirely in the uterine wall. The malignant growth in the uterus occupied the upper part of the fundus uteri, extending to the peritoneum but in the gross specimen did not seem to reach nearer than a quarter or half an inch to the endometrium. The growth in the uterus was about 2 inches in diameter.

Two weeks following the removal of the uterus, or about four weeks after the first operation at which the nodules were removed from the vagina, there was a recurrence on the left side at the site of the original nodule. I had personally made no local examination for several days, but when the recurrence was reported to me by the nurse it had again reached the size of an English walnut, showing the rapid growth. This recurrent nodule was excised under a general anesthetic and 130 milligrams of radium applied for nine hours.

*Subsequent Course.*—Three months later while automobiling the patient had an attack which was said to resemble epilepsy, but lasted only a few moments. This was followed in another month by a more severe attack, during which the patient became unconscious and later was hemiplegic. Subsequently the patient developed a pneumonia and pleurisy. The patient died nine months after the first operation with unmistakable signs of metastases in the brain and the lungs. There was no further local recurrence demonstrated either in the vagina or in the vaginal fornices.

*Conclusion.*—There are several points in the case that are of special interest:

1. The long interval (three and a quarter years) between the last known pregnancy and the appearance of the growth. This apparent interval is probably correct as no history suggesting pregnancy could be obtained from an intelligent patient, and as the patient had been overcured she would not be likely to become pregnant.
2. The location of the growth in the uterine wall and at least a quarter of an inch from the endometrium.
3. The absence of another local recurrence in the vagina after an early recurrence had been removed and radium applied.

#### DISCUSSION.

DR. HIRAM N. VINEBERG, in opening the discussion, said: "Would you compare the term deciduoma to chorioepithelioma? Do you think there is a distinction between them?"

DR. HOWARD C. TAYLOR.—"In answer to Dr. Vineberg's question, I do not recognize any difference between a chorioepithelioma and a malignant deciduoma."

DR. HIRAM N. VINEBERG said: "I think I have had at least eight of those cases and have been very lucky with them to say the least. All recovered and, as far as I know, all are living. The first one was done over ten years ago. The only exception was a case in which a diagnosis was made in the laboratory. In that case the



patient got up a septicemia and died from septicemia. At the postmortem a secondary deposit was found in the lung, but even in the cases that are operated upon early with secondary deposits elsewhere, the prognosis is good because they become absorbed and the patients continue in good health for a long time. I have gone over these cases for the last couple of years and found that they were all still living and well. Some were pretty far advanced so far as the uterus was concerned, and a point that I have been able to observe for myself is that sometimes the clinical data is more reliable perhaps than the microscopic. In several of those cases I was able to make a diagnosis by the fact that the patient had had a miscarriage or a pregnancy within two or three months and had a most profuse hemorrhage such as is not seen in any other condition and in passing the finger into the uterus a small nodule in the uterine cavity was encountered."

DR. FREDERIC C. HOLDEN.—"I would like to ask Dr. Taylor what dose of radium was used?"

DR. JOHN O. POLAK.—"Is there anything that you know of, clinically, that bears out the statement that has been made that the removal of the original growths sometimes cause absorption of the metastatic growths? That statement has been made in several text-books."

DR. HOWARD C. TAYLOR (closing the discussion).—"I would be very doubtful about that. An attempt was made some years ago to distinguish between malignant and benign deciduomata. I think this was an unfortunate thing to attempt to do because any difference certainly could not be distinguished clinically. I certainly would not expect a malignant deposit to be absorbed by removing the original growth.

"Replying to Dr. Holden's question, we used 130 milligrams of radium for about nine hours at one single application."

"Regarding Dr. Vineberg's remarks I think he was fortunate to have saved seven out of eight cases of malignant deciduoma. The only case I have saved was one in which the uterus was removed for hydatidiform mole and the malignant deciduoma was found in the laboratory.

DR. HIRAM N. VINEBERG, reported a case of

TRAUMATIC INJURY TO RIGHT URETER DURING DELIVERY. URETERO-VAGINAL FISTULA. HYDROURETER SIMULATING ABDOMINAL EXUDATE. REIMPLANTATION OF URETER.

"Traumatic injuries to the ureter during childbirth, are not often met with, in recent times. The writer has seen only one other case during the past fifteen years. In that instance, the medical attendant had applied high forceps which caused a deep tear of the cervix, extending into the base of the left broad ligament. The patient began to show abdominal distention soon after delivery and was seen by a prominent gynecologist, in consultation, on the second and third days postpartum, who made rather light of the condition.

When seen by me on the fourth day, the signs and symptoms of ascending peritonitis were unmistakable. The medical attendant, a very intelligent man, said there was a feature of the case he could not understand and that was, on catheterizing the patient, shortly after delivery, he noted a few drops of blood come away toward the end.

"It was very difficult to examine the patient, who was very stout, but on passing my middle and index fingers into the rent in the base of the broad ligament, there was a gush of very fetid urine. The cause of the ascending peritonitis could then easily be explained, there had been infiltration into the pelvic peritoneum from the injured ureter, setting up a peritonitis which spread rapidly and ended fatally on the sixth or seventh day postpartum.

"The case, which I am about to report, was that of a woman thirty-five years of age, who was admitted to my service, Mt. Sinai Hospital, October 26, 1916. She was married two and one-half years, had a miscarriage at ten weeks, eighteen months ago, and had been delivered of a full-term child the middle of June of this year. The labor had been in progress forty-eight hours when forceps were applied and a dead child extracted. There was an extensive laceration of the perineum, which was not sutured at the time.

"On the first day postpartum, the patient began to complain of pain in the right lower quadrant of the abdomen, radiating to the thigh. The abdomen gradually became distended and the pains grew very severe. She was admitted into St. Mary's Hospital, Brooklyn, on the fifth day postpartum and, at this time, the patient said she began to have a profuse watery discharge from the vagina. She stated further, that with this discharge, the swelling in the right side of the abdomen, would seem to disappear. No stress being laid upon this statement, it escaped my attention when the history of the case was read to me and, consequently, a wrong diagnosis was made, as will appear later. The perineum was repaired and cervix amputated, in St. Mary's Hospital, on the seventh day postpartum, and the patient was discharged as, apparently, cured, ten days later.

"About nine weeks previous to admission, the pain in the abdomen and profuse vaginal discharge returned and persisted for about three weeks. Two weeks later, she began to complain of bearing-down pain with frequency of micturition, when up and about. The vaginal discharge had entirely subsided. Five days prior to admission, the pain in the right of the abdomen, returned. It radiated to the thigh and back. There had been no nausea or vomiting, no chills or fever.

"On examination, we found the vaginal vault presenting an irregular scar, the vaginal portion of the cervix very much shortened, as if it had been amputated, the uterus was of normal size and position. In the right side of the abdomen, was a hard smooth mass extending from just below the rib border to Poupart's ligament. It seemed superficial as if intramural, was moderately tender, and entirely fixed. Most of the previous history was not obtained until later, after close questioning, and the chief points, in the history,

at the time of the first examination, were a difficult labor, followed by pain and a swelling in the abdomen, which persisted up to the present time. The natural inference was that the patient had a postpartum infection which resulted in a cellulitis, extending between the abdominal wall and parietal peritoneum, a condition not infrequently met with. It was also thought that deep indefinite fluctuation could be detected, at one point. Accordingly, a short incision was made over the most prominent part of the mass and after the skin and fat had been cut, an aspirating needle was thrust into the mass, in various directions but no pus was obtained. The incision was then lightly packed with gauze, in the hope that the exudate would break down, ultimately, and discharge through it.

"Four days later, the patient drew our attention to the fact that the watery vaginal discharge had returned and we then noted that the abdominal swelling had considerably decreased in size. A careful examination was now made of the vaginal canal and a very small slit-like opening was detected, in the right lateral wall, about 1 inch from the introitus. This opening was surrounded by a small ring of granulation tissue. It admitted a fine probe, for the distance of about  $2\frac{1}{2}$  inches. On dilating it with dressing forceps, a small amount of urine and pus escaped. The condition was now made clear, we had to do with a ureterovaginal fistula, which became constricted from time to time, causing a distention of the ureter, which, in time, gave rise to the apparent abdominal exudate.

"A cystoscopic examination showed the left ureteral orifice normal and emitting, regularly, jets of urine, the right ureteral orifice lying dead and the ureteral catheter was arrested at 1 cm. from the bladder. The bladder urine was practically normal. About 50 c.c. of urine was collected from the fistula. On examination, it showed blood cells, evidently from the tract of the fistula, a marked trace of albumin, and urea 0.2 per cent.

"The chief complaint of the patient now, was the escape of urine from the vagina. I decided, therefore, to open the abdomen, palpate the left kidney and, if found apparently normal, to reimplant the left ureter into the bladder. Accordingly, this was done November 14. On opening the abdomen, the left ureter was found dilated to the size of the thumb, as high up as it was visible, which was a little distance beyond the brim, but as the palpation of the kidney detected no appreciable enlargement, a reimplantation of the ureter, into the bladder was carried out. The ureter was mobilized and divided, near its entrance into the vagina. It was then carried through a slit, made at the lower part of the broad ligament, and implanted into the right lower quadrant of the bladder. For the first three or four days following the operation, the urine, as was to have been expected, was very bloody. After this it gradually became clear and the patient made an uninterrupted recovery, with primary union of the abdominal wound. She was discharged from the hospital December 3."

## DISCUSSION.

DR. EDWIN B. CRAGIN.—“I have had two or three of these cases but have not had an opportunity to cystoscope them at a considerable period afterward. Symptomatically they have been cured. The last one upon whom I attempted to implant the ureter into the bladder had a pelvis so deep and an abdominal wall so fleshy that I finally decided, especially in view of the numerous reports of these artificial implantations not being permanently satisfactory, to remove the kidney instead. This was done with a complete cure of her ureteral leakage through the vagina from which she had suffered for two years following an extensive vaginal hysterectomy by myself for carcinoma of the body of the uterus chosen in preference to an abdominal hysterectomy on account of the large fleshy abdomen.”

DR. HENRY D. FURNISS.—“This afternoon I had the opportunity of examining a patient on whom I did an implantation eighteen months ago for stricture of the lower end of the ureter and while the opening was visible, after giving the patient indigo carmin intravenously the normal side eliminated the dye in four minutes and in fifteen minutes there was no elimination from the implanted side; so even though it may be draining a certain amount of urine (I am not sure that it even does that) the function has been very much decreased in that time.”

DR. VINEBERG, in closing the discussion, said: “I have nothing to add except that I was anxious to hear from other observers as to whether or not they had seen any cases in which the implanted ureter had continued to functionate. Until lately I was always of the impression that it did well. I know of one case at the hospital, in the hands of another operator, however, in which both ureters had been cut and on leaving the hospital the patient was all right. We have tried to trace her, but have not succeeded. If I do I will be glad to report the case to the Society.”

DR. E. W. PINKHAM presented a preliminary report on a case of

## ADENOCARCINOMA CORPORIS UTERI.

Mrs. B., aged fifty-two, a widow, was referred to the Woman's Hospital, November 6, with a diagnosis of abdominal tumor, which has been noticed for about two months. On entering the hospital, the patient said she had had no pain up to three weeks ago, when she began to suffer very severe pain all over her right side. The family history was negative. Her last period was in 1913. She was married in 1890 and has had three children, twenty-five years, twenty-four years and twenty-three years old. She was torn a little with her last baby. No miscarriage. She has had no illnesses, operations or injuries. Since her change of life she has had a slight bleeding from the vagina about three months ago. She had a little odorless discharge off and on. Her pain commenced just above the umbilicus like a pressure. For the past week, the sharp pain has gone down into the right groin. No pain for the past two days. No backache or headache. Slight bearing-down pain in right side

of pelvis. Was more comfortable lying on her left side or back. Has been performing her household duties as usual. Appetite good and bowels regular. Has lost little if any weight.

Examination showed a large tumor extending about 2 cm. from the angle of the ribs on the right side, to the pelvis and over to the left side 3 cm. from the middle line. It was not fully movable and of the consistency of a multilocular cystoma. Bimanual examination showed the uterus somewhat enlarged backward, pushed to the left and not movable. Left adnexa not felt.

At operation, November 9, 1916, the abdomen was opened by a long median incision. A large polycystic tumor presented itself. Examination showed it to be a cyst of the right ovary, bound by adhesions to the abdominal viscera, sigmoid uterus and pelvic wall. The adhesions were rather easily broken up, during which process one of the cyst cavities was punctured. Through this puncture, a large amount of brown viscid fluid was aspirated. The tumor was lifted out of the abdomen, its pedicle ligated and the mass removed.

The uterus showed an area of softening on the right side of the body distinct from the general consistency of the rest of the body. A supravaginal hysterectomy with the removal of left adnexa, was performed, the cervical mucosa and about 5 mm. of the surrounding musculature was reamed out with the scalpel. An abdominal drain of gauze and rubber dam was inserted. On the tenth day the drain was removed. Patient left the hospital in first-class condition Dec. 6, 1916.

#### *Pathological Report.*

*Diagnosis.*—Adenocarcinoma corporis uteri. Cystoma ovarii with secondary papillary adenocarcinoma, metastatic from uterus?

*Examination of Specimen.*—The inner walls of the cyst were smooth, trabeculated and carrying two friable papillations  $1\frac{1}{2}$  cm. in diameter. Uterus measures  $6 \times 5 \times 4$  cm. Surface is smooth, covered by bloody adhesions. The internal orifice is stenosed. The mucosa of the uterus is hemorrhagic papillated without apparent invasion of the myometrium. The serous surface of the uterus shows scattered superficial papillations. The ovary is slightly enlarged, contains a small cyst 2 cm. in diameter.

Section from the corpus uteri shows cystic and cork-screw-shaped glands at the bottom. Upon the apparently normal layer of mucosa follows a mass of irregular tortuous coils of glandular tissue, the latter showing two layers of epithelium. There is a distinct optical unrest in those epithelial coils and numerous mitoses.

Sections from the ovarian cyst wall show solid epithelial collections with almost no stroma between the cells. The cells are very small, in certain areas, arranged in pearlstrings also garland-shaped cell rows with central lumina and many places Faserzell-metaplasia. Other sections show muscular and myomatous tissue and intact ovarian tissue.

#### DISCUSSION.

DR. ROBERT T. FRANK, in opening the discussion, said: "Not having seen the specimen, I am rather at sea as to how the sections,

etc., look. I would like to ask Dr. Pinkham, however, why the growth is designated as primary in the uterus instead of in the ovary, or why, for instance, there might not be two coincident carcinomata, one in the ovary and one in the uterus. It is not exactly clear to me how he differentiates the primary site from the metastatic one."

DR. E. SCHWARZ, having made the pathological examination, replied as follows: "I think Dr. Frank is perfectly justified in asking the question he has, as the interesting point lies in the differential diagnosis. There are three possibilities, first, that the carcinoma in the uterus was primary, with secondary carcinoma in the cyst; second, that the reverse was the case, primary carcinoma in the ovary and secondary in the uterus; third, two independent carcinomata. The adenocarcinoma in the uterus is of the type of adenocarcinoma which one finds in the corpus. The fact that there is central metaplasia in the cell masses indicates almost certainly that the ovarian growth is a secondary growth from the uterus because the presence of metaplasia in epithelium lining ovarian cysts is very rare. That this should occur as a central metaplasia, apparently as a maturing process of the cell masses in the ovary, it could only occur in case the cell was inclined to form metaplasias there. I do not know that ovarian carcinomata of this type do form central metaplastic foci. It is perhaps one of those rare papillations. The cell complexes in the ovarian papillations are entirely different from the papillations usually occurring in the ovary; the cells are small and differ widely from those of the uterus. The cell aggregates in the ovarian cyst (*i.e.*, in the papillations) resembles metastases from carcinomata of the corpus. The density and smallness of the cells are caused by the changed surroundings. Such changes, based probably on mechanical influences, are frequently observed in metastases of corpus carcinoma in the cervix."

DR. HAROLD BAILEY read a paper on

#### THE USE OF RADIUM IN GYNECOLOGICAL DISEASES.\*

##### DISCUSSION.

DR. JOSEPH B. BISSELL, in opening the discussion said: I am grateful to Dr. Bailey for his very elaborate exhaustive and interesting paper on the subject of radium in gynecological diseases. It is very difficult, however, to cover all of his many points in the short discussion which I have in my mind.

I agree with the doctor that it is a great pity that radium has been exploited as a cure-all for cancer. You might just as well exploit the knife as a cure-all for cancer. The percentage of successes and failures with radium is about the same as with the knife. It is a great pity indeed that many people have rushed into the use of radium to cure cancer.

The cure of cancer, as I understand it, is the removal of the symptoms and the prevention of the possibility of their ever returning.

\*For original article see page 556.

The knife does not do that as a rule, even when we get at the patient very early.

Radium does injury to all tissues. I think that it does more injury to the embryonic tissues; that is the reason it destroys the cancer cells which it reaches. It also destroys living tissues. It destroys healthy cells to a certain extent and the reason why perhaps radium has been vaunted as a cure-all is because in the smaller cancers where the radium has been used in sufficient quantity and at the appropriate time, it has destroyed the cancer cells and it also histologically, as I understand it, increases the resisting powers of the normal tissues and thus helps to absorb the tissue which it has destroyed. It is not always that we have not enough radium, but perhaps we use too much or we use it too long or we destroy so much cancer tissue which remains to be absorbed and thus overwhelm the patient and render them nonresistant to a return or to the continuation of the growth of the cancer cells.

The dosage of radium is an uncertain proposition for the reason that we know so little about it; although we have a great deal of literature on it (some of it very poor) we do not know even now the normal dose that should be administered. The idiosyncrasy of the particular patient has also a great deal to do with the dosage. At first we used lead filters entirely, but we have since learned that lead filters do a great deal of damage in many cases by producing secondary rays and they do not contribute very much to the action of the radium. We feel that the Alpha rays are material and only penetrate an extremely short distance. We know that the Beta rays are electrons or ions and there are many varieties of them, soft and hard. The Gamma rays are deeply penetrating, 40 times as much so as the  $x$ -ray which they resemble in other respects.

The subject of the cure or the relief of fibroids is a very interesting one. It does not do to accept the statements of our enthusiastic radium friends either with doubt or laughter in our minds. As a matter of fact we are reasoning human beings and we have our eyes and our fingers and can see and feel. If a man tells me that a fibroid tumor which was present when he began radium treatment had gone since he has used it and offers to demonstrate that fact, I do not see, especially when he is there to prove it, that there is anything left for us but to accept his statement as correct.

There is some danger connected with the use of radium and the danger is a real one. In my own experience I would like to mention the case of a patient who refused to submit to a removal of the uterus on account of a very large myofibroma. The application of radium in this case was made several years ago and as in all my earlier attempts in the use of radium in the treatment of fibroids, consisted in placing into the fundus of the uterus a pretty good sized dose and leaving it in for a period of twelve or eighteen hours. The patient was to come back again for an examination in three weeks. Three or four days after the application of the radium her physician telephoned me saying she had an attack of grip which lasted more than three weeks. She came back in a week after that and I made another

application of the radium into the fundus for twelve hours of a good-sized dose. The following day she had a severe chill and apparently had the symptoms of grip again with bloody urine and great pain in the bladder and back and developed serious hemorrhagic pyelitis, beginning apparently in the ureter and bladder. She had a very stormy time of it for two or three weeks and I was very much afraid she would die. However, she finally recovered and in a couple of months came to see me again and I gave her another application of radium (I did not get enough in my former experience and wanted more) and she had a similar attack. She recovered, however, entirely from the subjective symptoms of the fibroid. In spite of the fact that I hesitate to state this, because there may be a feeling of incredulity on the part of some present, but the fibroid which was about as large as a baby's head at the beginning of the treatment, which was in the fall of the year, at the end of the treatment which was at the end of the following summer, had diminished in size to that of a small orange. I have not seen her since. She recovered from her symptoms, not only of the fibroid, but also from the damage of perhaps an overdose of radium.

Radium is also valuable in a good many of the symptoms of gynecological disease and one thing which it checks is bleeding whether due to fibroids or due to recurring or beginning carcinoma of the cervix or other malignant conditions. It is also useful in other clinical symptoms, as, for instance, the discharge and odor which go with cancer.

In recurrences in the cervix and in inoperable cases it is really the last help. It restores hope to the patient and that is all we can ever think of doing. It has more to offer them after recurrences than the knife has even if it is true that it does damage where there is infiltration of the cancerous material into either vaginal wall. I have had three cases where after a fistula had been made, either by an incautious operator or by his assistant, between the bladder and the vagina, where the application of a very small amount of radium placed in the fistula (I am not speaking of cancerous fistulæ, but of traumatic fistulæ) for a period of about ten minutes for two or three treatments had the effect of causing the fistulæ to heal very rapidly.

Another word about filters. Lead and gold are the worst because they produce so many secondary rays. A special alloy is made which has the advantage of producing few secondary rays and have great screening power. I agree entirely with Dr. Bailey in the statement that what we need most is more clinical experience with the use of radium and then we will have more confidence in its value in the treatment of gynecological diseases.

DR. F. C. WOOD in the discussion said: I was very glad to hear Dr. Bailey's paper. At first, I felt that he was going to be a little too optimistic about radium, as is usually the case with those who have recently begun its employment; but as he went on he became more and more conservative, until finally he reached the conclusion that I have felt for some time is the only justifiable one; that is, that it is unwise to employ radium in the treatment of operable



tumors. Before we can honestly recommend to our patients that operable tumors be treated with radium, we must be perfectly certain that the results with radium are better than those obtained with surgery. There is, at the present time, not the slightest evidence that such is the case. With all the remarkable effects produced by radium, which I would be the first to acknowledge, we are not yet in a position to judge of the ultimate results. Many tumors, especially lymphomata, yield rapidly to radium, and some types of carcinomata, especially those of the body of the uterus and of the cervix, seem especially sensitive to the influence of the rays. But the final results must be judged only by a careful study of cases observed over a period of years. A surgeon would laugh at a colleague who reported a cure for cancer a few months after operation, as bitter experience has taught the operating fraternity that five years must elapse before permanent cure can be regarded as in any way certain. Unfortunately, most of the radium cures are reported a very short time after the disappearance of the main mass of the tumor, although some of the German gynecologists have shown that within a year or a year and a half recurrence takes place in the lymph nodes of the pelvis, if not at the site of the primary growth. The fact that radium slows the growth of tumor cells may compel us to wait even more than five years before we say that a given course of treatment has resulted in a permanent cure. Unfortunately, also, in many of the cases in the literature no microscopical examination of the tissue was made before the radium was applied, and these reports must, therefore, be rejected in any final discussion of the subject.

As Dr. Bissell has just said, we know as yet but little of the necessary dosage, for all radium work is still in the experimental stage. It has long been known, however, from experiments on the eggs of sea urchins and other marine types that a small dose of radium will stimulate a cell, while large doses slow this growth or prevent division, and still larger doses destroy the cells. There is, undoubtedly, a great deal of evidence from clinical cases which leads one to believe that with insufficient doses of radium a stimulation of cells at a considerable distance from the radium tube may occur, and it is suggested by Kirmisson in a recent report to the Academy of Medicine of Paris that more extensive metastases result after treatment by radiation than would have occurred if the tumor were left alone. This adds one more complication to the question of radium therapy.

In this connection it has been shown by one of my associates that small doses of radium will greatly increase the rate of growth of tumor cells in mice, and that this stimulation lasts through eight or nine transplantations of the tumor, the weight of the growth so produced being sometimes twice that of the control tumors.

There are many other problems, which I can only indicate here. One is that while carcinoma tissue in the body is more sensitive to radiation than is the surrounding tissues, owing to the lack of sufficient vascular supply to the tumor cells, yet it is also true that the cancer cells in immediate contact with normal connective tissue are highly resistant because in this situation they are well supplied with

blood current. For this reason, the destruction of the final remnants of cancer tissue without destruction also of the normal tissues which support it is difficult.

The reaction of the connective tissues induced by radium does unquestionably lead to the formation of dead scar tissue and a certain amount of encapsulation of still living cancer cells, and Murphy has shown that the lymphocytes which collect about a cancer unquestionably aid in the body resistance against the spread of the disease. Whether it will be possible to stimulate the lymphocytes so as to produce sufficient local reaction to destroy cancer cells is still in question and the matter can be decided only by a large amount of experimental work.

It has been my hope that radium might be employed as an adjuvant to surgical procedures by the giving of large doses and the removal of the tumor before burning of the tissues has occurred. The rays may, so to speak, sterilize the cancer cells and thus prevent the formation of metastases due to the spreading of tumor emboli through the vessels, such as must necessarily occur during the operative handling of the organ containing the neoplasm. Here again, however, only large clinical experience will enable us to make a final judgment.

If we turn from the use of radium as a cure for cancer and consider it merely as a palliative, we have a field in which this agent is most valuable. There is no question but that by suitable radiation of inoperable tumors the life of a patient may be prolonged in reasonable comfort, and this is a very great thing and entirely justifies the employment of radium under these circumstances.

My own feeling has been that radium as at present used is more powerful than  $x$ -ray in the destruction of tumors, but it is only a question of time when the production of  $x$ -rays of short wave lengths approaching those of the gamma rays of radium will be made possible by the use of suitable apparatus. Radium then will be necessary only for the treatment of internal tumors, like those of the uterus; where the tube carrying the element can be placed in close contact with the tumor itself thus avoiding the passage of the rays through the healthy tissues surrounding the neoplasm. Here again we are entirely in the experimental stage, and time only will enable us to decide.

In conclusion, Dr. Wood said that he had asked one of the leading advocates of radium therapy what he would do if he had an operable epithelioma of the lip, and had received the prompt reply that he would have it excised and would not use radium. To the speaker, this seemed to state the situation at present very simply.

DR. ROBERT T. FRANK said: Dr. Bailey gave us a very interesting résumé of the general question of the use of radium, Dr. Bissell spoke about the general aspect in gynecology and Dr. Wood has told us about some of the experimental results and the important pathological facts which have been elicited. I want to give you simply an outline of a small series of inoperable carcinomata of the uterus which I have treated with radium. The results obtained are

purely primary as the treatment in the case which is the oldest in duration was only started December 5, 1915. In former days when I saw an inoperable carcinoma of the uterus I would do my best to avoid having the care of the case. I know of no more unsatisfactory condition to treat by any method. To-day I am very glad to treat an inoperable carcinoma of the uterus because I can employ radium. I have seen ten cases, the last of which I only started in September. An outline would be about as follows: The patient comes with a large cauliflower stinking, bleeding tumor the size of a fist occupying the whole vault of the vagina and will give a history of a loss of weight and the usual symptoms with which you are familiar. After two applications of radium, varying in quantity between 50 and 130 milligrams (the latter is the largest amount I have at my disposal), bleeding usually stops.

*Subsequent History.*—The foul discharge will diminish and after perhaps three or four treatments the cervix instead of being the site of a large protruding mass, presents a crater-like formation which continues to contract until the final stage resembles that of a senile atrophic cervix. The region eroded is covered by a yellow, uncooked, bacon-like slough which comes off with great difficulty and can be removed for microscopic examination only by scraping it off. The whole cavity formerly occupied by the tumor is usually obliterated. I take it for granted that much of the infiltration of the parametrium is inflammatory. I have no means of knowing how much of the infiltration is neoplastic.

Several of the cases which were relieved of the local symptoms have since shown signs of loss of weight, I won't say cachexia, but general weakness, which makes me suspect that there probably is an internal recurrence, although in but one case have I been able to determine that. In that case there are apparently nodules in the liver.

The class of cases which have been treated are as follows: Five were large growths such as I described. Two were cases which had been cauterized repeatedly and in one of them (a case of Dr. Vineberg's) there was a nodule present after repeated cauterizations. I felt fairly confident that this case was going to recur. The other one recurred during the course of the cauterizations, at which time there was no doubt about the carcinoma still being present. One case was treated subsequent to Wertheim operation followed by vaginal recurrence. Two were borderline cases and those cases are particularly instructive along the lines mentioned by Dr. Wood. In the one I gave six treatments of radium of considerable dosage, going up close to 9000 milligram-hours during the course of eight weeks. She was then operated upon by Dr. Brettauer and the carcinoma had cleared up as far as the cervix was concerned. He found induration of the connective tissue, so much so that he was unable to liberate the ureter on one side. Such long preliminary treatment renders operation almost impossible. The next case was one which was radiated twice and operated upon nine or ten days after the beginning of the radiation. Here no change in the

connective tissue was noted, as the operation followed radiation in close sequence. I have brought along a few photomicrographs which will illustrate most of the points that have been referred to this evening. These represent an inoperable case of carcinoma (squamous cell) before radiation, and the other pictures are those taken after radiation. Notice the change in the cancer cells until finally there is nothing but detritus in the final one. The second case is a squamous-cell carcinoma of the cervix before radiation. This is the case which I mentioned in which six or seven radiations were given and the uterus then removed. This uterus was cut into small sections and in only two spots were minute foci found, which are probably carcinomatous. The third picture is one taken after two radiations in nine days, showing that although the carcinoma is probably biologically sterile, meaning by that that the cells may be temporarily inhibited or even killed, they have not changed in appearance.

There are just two more points which I want to bring out which perhaps explain the rapid action of radium on cervical carcinoma. I think that carcinoma of the cervix is an extremely favorable site for radiation because the cervix is surrounded on all sides by enormous masses of connective tissue (parametria) spreading out in all directions and therefore we get the full effect of the shrinking produced by radium on normal tissues. We have a "starving" of the cancer, particularly in the parametrium, such as follows ligation of the internal iliac vessels, as the contracting connective tissue mechanically occludes the vessels and lymphatics.

Finally I would like to say that the primary results are extremely encouraging. It is an easy way of offering relief in inoperable carcinomata of the uterus. It is an excellent way to inhibit or sterilize the growth before performing operative removal and it enables one to do a less radical operation than could be done before we used the radium. As to the final results obtained with radium I feel rather pessimistic.

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## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA

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*Meeting of November 2, 1916.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

DR. BARTON COOKE HIRST, presented the report of a case showing

### THE RESULTS OF ANTERIOR ABDOMINAL HYSTEROTOMY.

In February, 1916, a patient applied to me with the statement that she had had five children, the last one six years before and one miscarriage five weeks before with a hydatidiform mole. Her chief complaint was that she had been bleeding ever since. On examina-

tion the uterus was found distinctly enlarged, retroflexed and there were quite extensive lacerations of the birth canal. I did not see this woman again until September, 1916, when she reappeared in my office with her physician, stating that she was pregnant and suffering intolerable pain. On examination there were the evidences of a pregnancy from six to eight weeks advanced, the uterus being firmly fixed in a position of anetversion and extremely sensitive. The injuries of the birth canal apparently had not been repaired. The patient's physician stated to me that the woman had been operated on by Dr. Deaver shortly after her first visit to my office in February, an abdominal section being performed and the uterus cut open in order to inspect the uterine cavity or to do an exploratory curettage; I do not know which. The examination proved to be negative as far as the examination of scrapings was concerned, if they were removed, or else the appearance of the uterine cavity did not suggest malignancy. Consequently the uterus was not removed but sutured and dropped back.

Although my case book has no record of what was recommended, my advice to the patient at her first visit, I imagine, had been to have an exploratory curettage performed in the usual manner, the scrapings to be examined for chorioepithelioma. If the report was negative that the uterus should be sewed in place by one of the operations for retrodisplacement and that the lacerations of the genital canal should be repaired. At the second visit in September, the patient applied to me for relief from her agonizing pain rather expecting, I think, that I would induce abortion, which I naturally refused to do. The woman will probably abort without interference and will probably abort again if she becomes pregnant. Even if her abdomen is reopened and the adhesions severed, the uterine scar remains to make expansion of the uterus difficult or impossible in subsequent pregnancies or to expose the woman to the danger of ruptured uterus in subsequent labors. If we could obtain the end results in the other women whose abdomens and uteri were cut open for incomplete miscarriage, to evacuate an immature ovum, to inspect the endometrium or to do an exploratory curettage, we would probably find similar histories.

In the past, the transactions of this Society were enlivened by the acrimonious disputes of Goodell and Ellwood Wilson. At a later date, Price shook his fist full of pus tubes in our faces and hurled defiance at his critics. No quarter was asked or given in debate.

More recently still we have patiently endured the scolding of our old friend, Baldy, whom we all like for his honesty of purpose no matter how severely he berates us. But times and manners change. Besides, the member at whom the criticism of this communication is directed holds a peculiar place among us.

We are all proud of the luster shed upon Philadelphia as a medical center by Deaver's brilliant surgery. We prize this asset at its true worth and are loath to see its value depreciated. Moreover, Deaver has achieved something even finer than his reputation as one of America's greatest surgeons. He has won and he retains the affec-

tionate regard of us all. If, therefore, his friends, the gynecologists of this Society deliberately decide that he is incorrect in a small department of his surgical work, they have reluctantly arrived at this decision for the following reasons:

We believe that an exploratory curettage, the evacuation of the uterus for an incomplete miscarriage, an investigation of the endometrium should be conducted by the vaginal route. We hold that when a minor operation certainly obtains the desired results, it is a violation of one of the precepts of surgery, to deliberately adopt a major operation, involving risk, to accomplish results as well or better secured by the minor operation. We contend that it is no justification for the major operation to say that as yet there have been no deaths from it in the hands of one accomplished surgeon. We feel further that the weight of great surgical authority should not endorse an operative procedure which, if adopted by surgeons in general would inevitably result in an occasional catastrophe that should have been avoided and if it occurs must be deplored as entirely unnecessary. We think that the general surgeon who does this work only as an incident of his other more extensive work, if he does it at all, should acquaint himself with the technic of curettage, of dilatation of the cervix and of the evacuation of the uterus if necessary, by an anterior vaginal hysterotomy; that he should familiarize himself with the metroscope and that he should not resort to abdominal surgery simply because that mode of operation is more familiar and easier to him than the safer operations demonstrated by the collective experience of the world to be most suitable for the purpose.

#### DISCUSSION.

DR. JOHN B. DEEVER.—I wish to express my thanks to the Society in giving me the opportunity of discussing the paper of my distinguished friend and colleague Dr. Hirst. I want further to say that I am much obliged to Dr. Hirst for bringing this subject before the Society and presenting a complication which followed a hysterotomy, as it is only by bringing forth the truth that we can judge the result of any operation.

The subject of transperitoneal hysterotomy has given me much thought as well as afforded me an opportunity of writing a few papers upon it. I have the great satisfaction of reporting to-night eighty-five cases in all without mortality.

The surgical method which has been proven beyond a doubt to be the best way of attacking a pathological condition or unfold a symptom-complex is, to expose the infected part to the light of day and the eye of the surgeon and in this way deal comprehensively with the living pathology as found; the greatest relief will be obtained with the least loss of function and tissue and a better guarantee against future complications assured.

One by one the cavities of the body have yielded to the surgeon. The treatment of concealed surgical conditions has improved in direct proportion with the boldness of the exposure and the direct-

ness of the attack. I am sure that uterine disease, as well as surgical pathological conditions of the stomach and other viscera, will give way to direct inspection and treatment under the guidance of the eye.

I firmly believe that early diagnosis and cure of malignant changes of the fundus of the uterus as well as the endometrium can be best accomplished by hysterotomy, and that a large maternal mortality in placenta previa can be reduced almost to nothing by this operation, while the fetal mortality will be greatly improved. In addition to these clean-cut indications for hysterotomy, the procedure will be found most beneficial in clearing up the exact condition in many cases now beyond our diagnostic powers.

It is not necessary to refer to statistics in the treatment of placenta previa or other complications of labor where delivery is performed from below, accidental detachment of the placenta, certain positions of the child calling for version under most unfavorable conditions, high forceps delivery attended by lacerations of the soft parts with consequent sepsis and so forth, without being appalled.

The operation of hysterotomy has always been saved as a last resort, and the crude efforts of our ancestors (and I regret to say some of the present generation of gentlemen practising this particular specialty) to avoid the peritoneum explains this great mortality. The operation until recently has been exclusively in the hands of obstetricians, and only obstetrical conditions have justified its performance; but obstetrics is notably conservative, as was gynecology until a few years since. We will admit that natural methods are always preferable, but it must be granted that in the presence of pathological conditions it is not wise to rely upon them until the patient is exhausted by methods directed from below, when hysterotomy performed as a last resort is too much akin to the watchful waiting policy that this country has and is suffering from, and the mortality advances to a point that condemns the operation.

In the last analysis any procedure must stand or fall upon its mortality and unless the obstetrician can show methods which are superior in result to those that I have quoted to-night (and which can be substantiated by the hospital records) he must yield.

It is conceded by everyone that certain degrees of contraction of the pelvis are indications for hysterotomy, but I believe and advocate its performance in placenta previa, certain cases of dystocia, severe toxemia of pregnancy and eclampsia, premature separation of the placenta, and in some cases of pyelitis of pregnancy with marked septic symptoms; in certain cases of submucous fibroids, in cases of unexplained uterine bleeding in middle-aged females at or near the cancerous age when cureting does not correct or clear up the condition, and in cases of prolapse of the cord with a living child and a rigid and nondilatable cervix.

In connection with eclampsia, while statistics do not mean that every woman should be operated, it does mean that obstetricians should revise their opinions regarding the status of this operation when indicated. Manual and instrumental dilatation is attended

by grave danger, causing shock, deep cervical tears, hemorrhage and infection, while with hysterotomy there is no shock and less infection and at all times the surgeon is master of the situation.

Everyone who has done much obstetrical work has met with cases of that dangerous complication of labor, an inert uterus distended with blood complicated by a further postpartum hemorrhage after delivery. Such cases must be packed, which causes infection when the uterus is tense and tender, the amount of hemorrhage increasing, the patient becoming more collapsed, hysterotomy is indicated and should be immediately carried out.

So much could be said in support of this subject and so little has been written upon it by master obstetricians that has been at all impressive that I should like to have the time to take up every complication of labor that would indicate this operation, but I prefer to leave this to my obstetrical colleagues until they have gone so far astray that it becomes the part of the modest surgeon to correct their evil ways and shed light upon what seems to them at present to be a hazy field.

Since reporting my last sixty-four cases, I have had twenty-one cases, making eighty-five cases without mortality. The report of the last twenty-one is as follows:

No. 65. Nine months pregnant, very large ventral hernia: Repair of hernia, removal of appendix, hysterotomy, living child.

No. 66. Five months pregnant with acute (nonperforative) appendicitis and intense uterine pain. Hysterotomy, removal of degenerated placenta and removal of appendix.

No. 67. Nine months pregnant, contracted pelvis. Hysterotomy and removal of appendix. Living child.

No. 68. Three months pregnant, fibroid uterus. Hysterotomy, degenerated placenta, myomectomy and removal of the appendix.

No. 69. Six months pregnant. Fibroid uterus tubal abscess and persistent uterine bleeding. Hysterotomy and removal of the appendix.

No. 70. Three months pregnant. Retained secundines, double bilateral tubal disease. Hysterotomy and removal of the appendix.

No. 71. Five months pregnant. Premature separation of placenta. Hysterotomy and removal of the appendix.

No. 72. Six months pregnant. Placenta previa. Excessive hemorrhage. Hysterotomy and removal of appendix.

No. 73. Four months pregnant. Hemorrhage, premature separation of placenta. Hysterotomy. Gall-bladder disease, cholecystectomy and removal of the appendix.

No. 74. Three months pregnant. Hemorrhage. Hysterotomy, degenerated placenta. Removal of appendix.

No. 75. Dilatation and curettage six months previously. Uterine hemorrhage. Hysterotomy, degenerated placenta. Appendectomy.

No. 76. Two months pregnant. Adherent retroverted uterus with adherent tubes. Uterus released, tubes released and not removed. Hysterotomy, shortening round ligaments and removal of the appendix.



No. 77. Pregnant one month. Uterine bleeding. Hysterotomy. Chorion epithelioma and removal of the appendix.

No. 78. Six months pregnant. Large interstitial myoma of the uterus. Uterine bleeding. Hysterotomy, myomectomy, removal of the appendix.

No. 79. Three months pregnant. Fibrosarcoma of back, eighteen months previously therapeutic abortion for exophthalmic goiter, following latter operation one-half of enlarged thyroid removed; patient recovered completely, constitutional symptoms having subsided. Again became pregnant with recurrence of constitutional symptoms of goiter. Hysterotomy end of four months, section of Fallopian tubes and removal of appendix. Pathological examination showed degenerated placenta with points of hemorrhagic infarcts.

No. 80. Five months pregnant. Toxemia of pregnancy. High blood pressure, low urea, etc. Treated medically for considerable time, no improvement. Hysterotomy, removal of appendix.

No. 81. Four months pregnant. Very anemic, uterine hemorrhage, much uterine pain. Hysterotomy and removal of the appendix.

No. 83. Three months pregnant. Painless hemorrhage. Hysterotomy, degenerated placenta. Removal of appendix.

No. 84. Six months pregnant. Toxemia of pregnancy with convulsions. Treated three weeks, vapor baths, purgation, diuretics, etc. No improvement. Hysterotomy. Removal of appendix.

No. 85. Seven months pregnant. Persistent, painless uterine hemorrhage. Hysterotomy, intrauterine submucous degenerated fibroid. Hysterotomy and removal of the appendix.

DR. E. E. MONTGOMERY.—I was unfortunate in hearing only the latter part of Dr. Hirst's paper. I was greatly interested in the discussion of "Hysterotomy" which Dr. Deaver has so assiduously promulgated, and certainly it has a place in surgery in those cases of fibroid growth which are situated within the cavity of the uterus and which are too large or too near the fundus to be removed through the vagina. Abdominal incision and delivery through the wall of the uterus affords less injury and is attended with less danger to the patient. There are cases in which the opening of the abdomen is justified, as Dr. Deaver claims, for making positive diagnosis. Recently I had a patient who had undergone some four months before an operation when the abdomen was closed believing she was pregnant. She came to me with a history of repeated bleeding, and I must confess that in making the examination I came to the conclusion the woman was suffering from a fibroid growth edematous in character. Upon opening the abdomen the uterus presented all the characteristics of pregnancy. From this together with the history I felt we had to do with an embryotic mole giving rise to degenerate changes in structure and I removed the uterus. The condition proved to be a hydatid mole and microscopic examination disclosed chorioepithelioma infiltrating the walls of the uterus.

I have seen numerous cases in which the patient has been curetted

and hemorrhage has returned. One of these cases was described in the last edition of my book. Quite a large mass was situated in one side of the uterus. I did not curet but opened the abdomen and removed the uterus finding as was suspected chorioepithelioma. As to those cases of contracted pelves, in 1883 I read a paper before the Philadelphia County Medical Society in which I advocated the performance of hysterotomy or Cesarean section in preference to craniotomy in all cases in which the child was living and the conditions were such that a viable child could not be delivered *via naturales*. I, therefore, claim priority over Dr. Deaver in advocating this procedure and in the performance of the operation.

DR. JOHN M. BALDY.—I do not know whether it is age or a feeling of chagrin at Dr. Hirst's remarks, but I feel somewhat quiescent upon the subject of such a burning issue as the present one. Possibly it is age which is bringing the lack of desire to openly express my opinion in regard to old friends and warm friends. Without being personal at all, I have never seen a general surgeon whom I considered first-class in pelvic surgery. As a matter of fact, I never saw one whose judgment I thought was third-class when he left the upper abdomen and went into the pelvis, and I am free to admit I have not altered my opinion since hearing Dr. Deaver's arguments. I take it from what Dr. Deaver has said that he is employing this operation for two reasons: therapy and diagnosis. I would probably have little quarrel on the question of therapy in regard to a certain number of conditions mentioned. I would probably not have a great deal of difference with him as regards diagnosis as applied to this procedure, if there were no other way of getting into the uterus. It is one thing to talk about "Seeing is believing." That, I believe, according to Dr. Deaver, was the sentiment of a colored gentleman, and taken literally, is about on a par with the colored gentleman's intelligence. With a uterus entirely closed and no possibility of getting information from any other source I should be inclined to open up the organ; but, as nature has made a very easy method of access and as the cavity itself is of very reasonable size and can be readily approached, I see no reason whatever for doing practically a major operation for what ought to be a simple diagnostic procedure. Now, I admit that curettage is a peculiar operation. It is an operation which is done a dozen times where it ought to be done once and generally by the man who ought not to do it at all. It is an outrageously abused operation. It goes without saying that a general surgeon cannot get information from this operation and I am not at all surprised that Dr. Deaver and some of the general surgical element of the profession have had to resort to other methods than the extremely simple one which nature has left open for them. I would hate to express all I feel on this question. I have never seen a uterus practically normal in size in which the cutting open would show me anything I could not bring out by history and curettage. Diagnostically I cannot see any excuse whatever for opening these uteri. If I felt I had to resort to this operation for diagnostic purposes in a uterus under three months pregnant I should feel that the

whole of my professional life had been wasted and that I had better begin over again as a boy and learn my business. That the general surgeon should come to us and pretend that he had more to deal with in the way of adhesions in the upper abdomen, than we have in the pelvis is an absurdity. As a matter of fact, the surgeon never found adhesions anywhere in the abdomen until the pelvic surgeon taught him they were there; never knew how to deal with them until the pelvic surgeon taught him. I have never found adhesions in the upper abdomen which gave me as much trouble as some in the pelvis. In the upper abdomen there is a large open field in which to handle them; in the lower the field is exceedingly narrow. In spite of all I believe that Dr. Deaver lacks ability in diagnosis in the pelvis, nothing Dr. Hirst and I have said or what Dr. Montgomery has not said, will have the slightest possible effect upon him.

DR. BARTON COOKE HIRST.—I want to make it clear that the criticisms in this paper are not directed at Dr. Deaver's Cesarean sections, but at a very considerable percentage of his cases which were nothing but incomplete abortions or cases in which the uterus was opened merely for purposes of diagnosis which I contend are better dealt with by evacuation or examination of the uterus by the vaginal route.

DR. RICHARD C. NORRIS.—It seems to me that Dr. Deaver's exploitation of hysterotomy is rather an exhibition of what *can* be done rather than what *ought* to be done, and we must differentiate between gynecology and obstetrics studied from the standpoint of hysterotomy. Dr. Deaver finds fault with the man who cures and finds nothing—the inexperienced man—and he casts his opprobrium upon that type of man. Suppose the same type of man undertook hysterotomy for diagnosis, he would do more than cast opprobrium upon him. The record of such a man in the community would be simply outrageous. We must therefore compare men of equal rank and experience and judgment when we consider methods of treatment. I think we should not allow the dictum of "hysterotomy for diagnosis" to go broadcast over the country without some criticism from our Society although so distinguished a member as my friend Dr. Deaver exploits it.

Hysterotomy in gynecology may rarely be of value in diagnosis and therapy. In this age it is the rarest thing that a case will come to operation without the careful man having made with almost certainty a diagnosis that does not require hysterotomy. It is to be expected that an unskilled man who would curet the uterus and throw the scrapings away would have unfortunate experiences, but this would not be the case with a skilled gynecologist assisted by his clinical and operative experience and by his laboratory aids. Surgical diagnosis, with its many collateral scientific aids is advancing and I believe there is less and less occasion to do exploratory laparotomy. In the gynecological field I believe there are very rare cases in which, *when all other methods have failed*, we can employ this operation of transperitoneal hysterotomy with advantage to the

patient. We would do this operation before taking out a uterus in a doubtful case, but certainly not for abortion, not for polyps, certainly not to find out whether the woman has a chorioepithelioma. There may be some cases in which the operation is justified as a last resort, but from my standpoint, it is not justified as a first resort. After section of the uterus the human eye cannot diagnose what the microscope has previously failed to find.

When we come to study transperitoneal hysterotomy in obstetrics we enter a field in which the aggressive surgeon is confronted by the more conservative obstetrician. There is an honest difference of opinion, and I believe that we are now on the borderline of an operative field in obstetrics that will make the conservative obstetrician advance more rapidly than he has been willing to advance in the past. There are cases of placenta previa, as we all admit, in which Cesarean section is the ideal operation, but I am sure that in my hands I would do less Cesarean sections and get both patients well than does Dr. Deaver who does Cesarean section for every type of placenta previa he meets. Some types of placenta previa do not need Cesarean section. In some types if we do Cesarean section we will lose the patient. This is true of premature detachment of the placenta. There are degenerative changes in heart, kidneys, or uterine muscle in which the patient subjected to hysterotomy would lose her life, which might be saved by a more conservative operation. Any obstetrician knows how high a fetal mortality there is in extensive premature detachment of the placenta when previa and central or normally situated. The child's interests in such cases are not to be considered. We have no quarrel with Dr. Deaver for applying his advanced surgery to advanced obstetrics, but this must be tempered always with obstetric experience and judgment.

Let us differentiate between the necessity for and the desirability of doing this operation. In a particular case more conservative treatment should have full consideration. Let us not forget that we must contrast Dr. Deaver's great experience and skill as an abdominal surgeon with the most skilful gynecologist or obstetrician employing more conservative methods. When this question goes out from the Obstetrical Society it should be accompanied with the criticism that the operation may be justifiable in the hands of some men under some very rare conditions, and that Dr. Deaver as the exponent of this advanced creed, is the enthusiast stepping in advance perhaps of a great many of us who are inclined to think him too aggressive in this particular field.

DR. ALFRED HEINEBERG.—On two previous occasions I have presented before the Obstetrical Society an instrument called the uteroscope to be employed in the diagnosis of intrauterine disease. In looking over the summary of the eighty-five cases of hysterotomy presented to-night by Dr. Deaver I find that there are twenty-seven cases in which the diagnosis of the condition could have been made without subjecting the patient to the risk of a transperitoneal operation. The cases alluded to are the following:

Submucous fibroid	1 case
Retained products of conception	11 cases
Chorioepithelioma	2 cases
Early carcinoma of the fundus	1 case
Degenerated placenta	4 cases.

With the exception of the case of carcinoma of the fundus which is difficult to distinguish from a polypoid endometritis, the diagnosis could have been easily established with no more operative procedure than dilation of the uterus and the introduction of the uteroscope under gas-oxygen anesthesia. Only the one case of submucous fibroid, the two cases of chorioepithelioma and the case of carcinoma of the fundus should have required more extensive operative treatment than the use of the curet or placental forceps after the uterus had been dilated and the pathological condition recognized. I feel sure that the case presented by Dr. Hirst demonstrates only part of the postoperative complications that may arise from even a clean transperitoneal hysterotomy, the fact that the operation has not been attended by mortality in the hands of Dr. Deaver by no means justifies its employment, if we have had at our command a simpler and less dangerous procedure, such as I here present again. The diagnosis of the conditions presented in the twenty cases with the possible exception of the carcinoma can be just as easily established by the uteroscope as by transperitoneal hysterotomy.

DR. STRICKLER COLES.—Speaking upon the obstetrical aspect of the question, I feel that while hysterotomy is warranted in many cases of chorioepithelioma, it is never advisable for the simple removal of the retained products of conception from a normal uterus; and in my opinion is absolutely unwarranted for purpose of diagnosis as any experienced obstetrician, guided by his trained sense of touch can readily explore the uterus, diagnose and treat the case without subjecting his patient to the trials of a major operation.

DR. GEORGE M. BOYD.—I did not have the pleasure of hearing the paper but did hear Dr. Deaver's entertaining discussion. I take it from his remarks that in a certain proportion of cases he does an anterior hysterotomy for diagnosis, even in early pregnancy. It is difficult at times to make a diagnosis of inevitable abortion in spite of hemorrhage. Often if such a patient be carried along upon expectant treatment the symptoms will subside and the pregnancy continue. Such expectant treatment, I take it, would not be carried out in the hands of Dr. Deaver. By resorting to anterior hysterotomy in such cases we may at times destroy life, and I think it would be unfortunate to have such teaching go out from this Society. If the wound in the uterus did not leave a vulnerable point and if adhesions did not frequently follow then in gynecological cases I think we could resort to anterior hysterotomy more frequently.

DR. JOHN A. MCGLINN.—I believe that when we analyze the question of debate before us this evening, we shall find that Dr. Deaver and the gynecologists are not so out of harmony as it would seem. The trouble seems to be, that apparently Dr. Deaver has not

taken the pains to find out what obstetricians and gynecologists really believe and teach. We obstetricians and gynecologists believe that in obstetrics abdominal hysterotomy is not only a perfectly justifiable operation but an operation *par excellence* in many obstetric complications. We have not only been doing the operation for many years but originated it and developed it. The majority of the cases that Dr. Deaver has presented to-night are pure obstetric ones and it is likely that any one of us would have performed the operation upon some of the cases. So far as the purely gynecological aspect of the question is concerned, we are not so much in accord with Dr. Deaver's views. While the operation is a perfectly justifiable one for diagnosis and in a lesser way for therapy, still its field is a very limited one. I venture the assertion that Dr. Deaver or anyone else could hardly obtain more accurate information by abdominal hysterotomy than a trained gynecologist could obtain by curettage, uteroscopy or by palpation and inspection by a vaginal hysterotomy. In the case of chorioepithelioma which he quotes from the *Lancet* I question if the unaided eye could have seen any changes in the endometrium which were not recorded by the curet and microscope. Again I have no doubt that had a curettage of the uterus been done at the time the hysterotomy was done, that the curet and microscope would have revealed the exact condition. Many mistakes are undoubtedly made in the microscopic study of curet scrapings. This, however, is not entirely the fault of a pathologist nor does it mean that the unaided eye is a more accurate method of diagnosis than is the microscope. In the majority of cases, it means that the scrapings have not been properly collected or that the pathologist has failed to make a study of serial sections. The operation of anterior abdominal hysterotomy is not without danger. I know of two cases operated upon by one of the foremost abdominal surgeons of this country, both patients nearly died from peritonitis and their pelvic organs were left bound together by dense adhesions. Some years ago when Dr. Deaver first presented the subject, he advised abdominal hysterotomy for removing a retained placenta. I should like to inquire whether he has changed his mind in this regard since that time and whether he considers the ordinary obstetric method of the removal of the retained placenta more dangerous than removal by abdominal section.

DR. GEORGE W. OUTERBRIDGE.—I feel very strongly that the question of the proper examination of curetings in the nonobstetric class of cases comprised in Dr. Deaver's paper is of vital importance. There is practically no organ to whose inner lining we have so easy access as the uterus, and I believe that the only cases in which we cannot make a positive diagnosis of carcinoma by microscopic examination of the curetings are those in which the condition is so early that the changes are merely those of cell structure in individual glands, before any thickening or polypoid condition of the endometrium has arisen—changes, therefore, which cannot possibly be recognized by the naked eye. I think the method of preparing curetings for microscopic examination is of more importance than is often

attached to it, for with poor slides the best pathologist cannot make a satisfactory diagnosis. Our experience has been that immediate fixation of all the curetted tissue in Zenker's fluid and subsequent imbedding in paraffin gives the best results: I would not want to trust to frozen sections in diagnosing early malignant changes in such soft tissue as endometrium. I can hardly agree with Dr. Foulkrod that it takes a week to go over all the tissue in any case; while careful search is, of course, necessary in doubtful cases this is a matter of a comparatively few minutes. It is, of course, necessary that the pathologist be thoroughly familiar with the normal cyclic changes occurring in the endometrium in order to differentiate early malignancy. I think that what applies to carcinoma is equally true of chorion epithelioma, as Dr. McGlinn has pointed out; any case too early to be evident in properly examined curettings could certainly not be diagnosed grossly at a hysterotomy. I do not see, therefore, that the article quoted from Mr. Tait has much bearing on the subject under discussion.

DR. DEEVER, closing.—I wish to say, Mr. President, that I am glad to have heard this discussion. I feel all the stronger in my position relative to this matter, in all due respect to the gentlemen who have spoken, because I have the experience of one of the best laboratories in Philadelphia and of the best men in that laboratory, and I know how often these laboratory men fail to make a diagnosis. I feel that my position has been strengthened and not weakened in the least, and I propose to continue in the "evil" tenor of my way. I am much obliged to Dr. Montgomery and the others who have spoken. I have learned a lot and have learned that the gentlemen who have expressed themselves have yet a lot to learn.

DR. ALFRED HEINEBERG presented a paper on

(1) ADENOMYOMA OF THE RECTOVAGINAL SEPTUM.\*

(2) CHORIOEPITHELIOMA DISCOVERED DURING PREGNANCY.

DR. GEORGE W. OUTERBRIDGE.—I am much interested in the two specimens shown by Dr. Heineberg, especially in the first because I had the opportunity of examining the slides from some of these polypi removed before the case came under Dr. Heineberg's observation. So far as I know there was no tumor in the vaginal vault or between the uterus and the rectum at that time. If such were the case it was not reported to me. I never saw the patient, only the specimens in the laboratory. Two small polypi removed from the vagina showed large irregular gland-like structures, lined by tall columnar cells, somewhat suggesting the appearance sometimes presented by the ends of Fallopian tubes caught in the vaginal vault after a vaginal hysterectomy. I must admit that the idea that this could be an adenomyoma of the rectovaginal septum did not occur to me because nothing was said to me about the presence of tumor, and I suggested as a possible explanation of these growths

\* See original article page 384.

that they had probably arisen from aberrant Müllerian duct tissue. Certainly there was nothing suggestive of malignancy in the cells at that time. It is interesting to know that these polyps recurred and recurred again, and that a definite tumor formed at this point. I should like to ask whether a radical operation was performed.

Also in regard to the chorioepithelioma, how far had the pregnancy advanced? Dr. Heineberg says the patient was never pregnant before. Is it his idea that the chorioepithelioma developed from the fetal elements of the existing pregnancy now in the uterus?

DR. HEINEBERG, closing.—Answering Dr. Outerbridge regarding the specimen I should like to have him look at it and see if he could determine the age of the embryo. The pregnancy must have been of several weeks, probably ten or twelve, because there were no chorionic villi except at the placental site, but the size of the embryo does not bear that out. The patient had not been previously pregnant and from my study of the case there seems to be widespread diffusion of both Langhans and syncytial cells throughout the uterine wall.

DR. FRANK B. BLOCK and (by invitation) DR. T. H. LLEWELLYN presented paper on

#### ORGANOTHERAPY IN GYNECOLOGY.\*

##### DISCUSSION.

DR. JOHN A. MCGLINN.—In cases of pelvic inflammatory disease reported by Dr. Block, I cannot understand how the use of corpus luteum extract could be responsible for the relief of all the symptoms. I can understand how it would relieve the vasomotor symptoms due to deficient ovarian secretion but I do not believe it to be responsible for the relief of the pelvic pain and backache. The relief of these conditions was probably due to the local treatment which the patients received in addition to their internal medication. There is no doubt that ovarian extract and corpus luteum extract have an important place in gynecology.

In certain types of cases we get most excellent results from their use. In my experience, their field of greatest usefulness is in the cases of surgical menopause. They are also of use in the natural menopause, but not to the same extent as in the surgical. I have also used these extracts frequently in amenorrheas due to obesity. In this type of case, I believe results are better if they are combined with thyroid extract. I have seen some results in certain types of dysmenorrhea, but on the whole the results have been disappointing no matter what combination of glandular extracts were used.

† I have used pituitary extract in some cases of uterine hemorrhage of undemonstrable cause and in a few cases, there has been control of the bleeding. In this type of uterine hemorrhage, however, I do not believe that we should waste very much time in the use of organotherapy.

\* See original article page 357.



If after thorough study, the exact cause of the bleeding cannot be diagnosed and if malignancy can be excluded, then I think these cases are better treated by radium or x-ray therapy. If there is any question as to the possibility of malignancy then these cases should be best treated by prompt surgical measures. Pituitary extract is a very valuable drug in the treatment of paralytic ileus. Its place in obstetrics has been well studied and needs no discussion. Pituitary extract has also been advised as a galactagogue.

Ott and Scott who studied this question claim that the secretion of milk is increased by administration of pituitrin.

Dr. Heaney, however, on the other hand, claims that the secretion is not increased but the apparent increase is simply due to the action of pituitrin upon muscle fibers which forces out what milk the breast contains.

An interesting phase of the subject of organotherapy is the inter-relationship of mammary and ovarian secretion.

This question is now receiving considerable attention but it is far from final solution.

DR. PHILIP L. WILLIAMS.—Some years ago I looked up the use of pituitrin as advocated by Ott and Scott and according to the work of Heaney. By the hypodermic injection of pituitrin the milk increased in quantity for a short period of time. Heaney's experiments were made with the seismometer measuring the expansion of the breast. These experiments showed the effect of the pituitrin extract on the muscle fiber in the breast. One of my classmates told me that he had been using pituitrin in tablet form with good results; so much so that the wife of one of the dairymen asked where they could get the extract for use with one of their prize cows. I had an interesting case in a patient who menstruated at sixteen, menstruation occurring every thirty days for ten years. Each time the patient menstruated there was bleeding from the uterus, and the pain was so great that she was forced to have recourse to opiates. This was following the enactment of the Harrison law and the young woman purchased paregoric from every drug store. I put the girl on ovarian extract, 2 grains three times a day three days before the period and for the first three or four days of the period. This was followed by entire absence of pain and disappearance of the endometrial cast. She has taken the corpus luteum extract with the exception of a few months ago when the prescription was changed from the original form to the English preparation of 5-grain tablets three times a day instead of the 2-grain. These had no effect and she passed a well shaped and formed cast of endometrium. She is now taking the American product. I should like to ask Dr. Block whether he found any difference in effect in the different types of corpus luteum used and if he has used that which comes in ampules for hypodermic use?

DR. BLOCK, closing.—Answering Dr. Williams concerning the corpus luteum, I have used both cow's and sow's, but I have not used the hypodermic form. Practically all the patients were seen in the dispensary. Most of the cases were on local treatment before start-

ing the corpus luteum. The improvement in some of the cases may have been due to the local treatment but this would not have influenced the scanty menses, the general undertone and the vasomotor symptoms. I believe the combination of local treatment and the corpus luteum is a good one, and that neither one alone will take the place of both.

DR. JOHN A. MCGLENN presented a report on

MYOMECTOMY IN PREGNANCY \*

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*Meeting of December 7, 1916.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

DR. GEORGE W. OUTERBRIDGE read a paper on the

SIMULTANEOUS OCCURRENCE OF CARCINOMA AND SARCOMA IN THE UTERUS.†

DISCUSSION.

DR. BARTON COOKE HIRST.—I should like to ask Dr. Outerbridge whether he saw the specimen I sent to Dr. Smith from my service in the University Hospital in which Dr. Smith first reported carcinoma and then sent me a later report that the growth was a sarcoma?

DR. JOHN G. CLARK.—I cannot let this opportunity pass without paying tribute to the expert pathologist. In the case which Dr. Outerbridge has reported of combined sarcoma and carcinoma occurring in a woman forty-three years of age, I was convinced at the time we performed the curettage for diagnostic purposes that the case was nonmalignant. It was, therefore, with great reluctance that I accepted the laboratory diagnosis and recommended a hysterectomy. After the uterus was removed, I was still in doubt as to the diagnosis and was only convinced of its accuracy after I had seen Dr. Outerbridge's sections. A clinical error a year before made me hesitate to take issue with Dr. Outerbridge on his diagnosis in this second case. In the first instance, a high amputation of the uterus for what I considered a benign hypertrophy incident to an old laceration had been performed; the report came back from the laboratory that the tissue was malignant. On clinical evidences, I disagreed and felt safe to let the case go without the removal of the uterus. Within a year she returned with a local recurrence of carcinoma at the site of the previous operation and she is now under radium treatment. Both of these cases show most impressively the necessity of adhering to the diagnosis laid down by our special pathologist. I use the word *special* for I am convinced that many of our very best general pathologists fall short in the questionable cases of malignancy of the uterus. The cyclic physiologic changes incident to pregnancy and menstruation constantly taking place in the uterus render this organ

\* See original article page 406.

† See original article page 575.

particularly susceptible to misinterpretation of the histologic picture as shown under the microscope. Time and again I have seen excellent pathologists not especially skilled in this branch of pathology fail to interpret these physiologic changes and ascribe them to pathologic processes with an unnecessary operation as a result. It is a pleasure to concede in both of these cases to my laboratory chief, Dr. Outerbridge, the correctness of his pathologic diagnosis in opposition to my clinical interpretation.

DR. OUTERBRIDGE, closing.—I have nothing to add except to thank Dr. Hirst for calling my attention to the specimens of this other case which I certainly shall look up.

DR. JOHN A. MCGLENN presented the reports of three cases. The first case was one of

#### PARASITIC FIBROID TUMOR.

This patient was operated on at the Philadelphia General Hospital, July, 1916.

Negress, aged thirty years. Complains of enlargement of the abdomen which has existed for the past three years. The enlargement has been gradually increasing in size. She has severe abdominal and



FIG. 1.—Case I.

pelvic pains; has lost weight. Menstruation regular, lasting six days, profuse but at no time has she had floodings. Examination of heart and lungs negative. There is a large, hard, nodular tumor filling the lower abdomen and extending at its upper level to mid-way between the ensiform and umbilicus.

Pelvic examination showed the entire pelvis blocked by the tumor.

*Diagnosis.*—Fibroid tumor of uterus. Operation advised and accepted.

*Operation.*—Long median incision extending from 2 inches above the umbilicus to the symphysis. When the abdomen was opened a very peculiar condition presented itself. Intestine and omentum were not in view. Entirely covering the tumor and almost hiding it from view were large tortuous blue blood-vessels having the appearance of innumerable worms. When the condition was studied it was found that these vessels were the omental vessels and that the fat had entirely disappeared from the omentum. Many of the vessels were as large as the index-finger. They all penetrated or came from the tumor.

The vessels were all ligated separately and the tumor freed from its parasitic blood supply. The tumor was found to be an intraligamentous one. The broad ligament was split and the tumor



FIG. 2.—Case II.

shelled out without difficulty and without the loss of blood. It was entirely parasitic as far as its blood supply was concerned. The tumor weighed 25 pounds. The uterus was found to be studded with numerous small fibroid nodules. The right tube contained pus. The operation was completed by removing the uterus, tubes and ovaries. Patient made a good recovery.

The illustration will give a slight idea of the size and character of the omental blood supply.

The second case was one of

#### DOUBLE PAROTITIS COMPLICATING PUERPERAL SEPSIS.

The question of parotitis as a complication of pelvic infection or pelvic operations is of interest. The close relationship of infective parotitis and orchitis in the male has led to the belief that there is

some connection between the parotids and testes in the male and the parotids and ovaries in the female. Some years ago Dr. W. A. Newman Dorland reviewed the literature of the subject and reported some unpublished cases. He held to the view that there was no anatomical connection between these glands and that the presence of parotitis after pelvic operations was simply due to a mouth infection and was no more frequent after pelvic operations than



FIG. 3.—Case III.

operations anywhere else in the body. In view of our present knowledge, is it not possible that the germs causing these infections have a selective action for these glands?

In the case I am presenting to-night, it is quite likely that the condition was one of metastatic abscesses. The case is deemed of interest on account of the size of the abscesses.

The patient was one of severe puerperal infection. She had been in the Medico-Chirurgical Hospital for three weeks, and was apparently doing better than holding her own. Suddenly one night,

she had severe pain in back of both ears and in several hours both parotids were swollen to the size of hen eggs. This swelling disappeared almost as suddenly during the following day. The next night the pain and swelling returned and the swelling of the parotids increased in size until they were as large as an apple. They were fluctuating and evidently contained pus. An incision was made and a large amount of pus evacuated. The patient died three days later.

The illustration gives an idea of the size of the enlargements.

The third case was one of

#### REPEATED CESAREAN SECTION.

The patient, a negress, aged twenty-three years, has a rachitic dwarf pelvis. She was operated on two years ago at the Philadelphia General Hospital by Dr. J. M. Fisher. He did a Cesarean section from which she made a good recovery. She was admitted to my service at the Philadelphia General Hospital July, 1916, pregnant for the second time. She was at term and was delivered by Cesarean section.

At this time when there is so much discussion on the question of once a Cesarean section, always a Cesarean section, this case is of some interest, the point of this being that there was absolutely no evidence in the uterus of a scar from the operation which Dr. Fisher performed two years ago. The patient made a good recovery from the operation.

(To be continued.)

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## TRANSACTIONS OF THE SOCIETY OF THE ALUMNI OF THE SLOANE HOSPITAL FOR WOMEN.

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*Meeting of October 27, 1916.*

*The President, DR. JOHN DOUGLAS, in the Chair.*

DR. GEORGE L. BRODHEAD reported the following cases:

#### I. NORMAL LABOR FOLLOWING CESAREAN SECTION.

The patient came to me on May 18, 1916, giving the following history: the first labor, some years before, had been at full term, and resulted in the extraction of a large stillborn child by the breech. The second labor had been terminated by Cesarean section, after a three-hour labor, the child again being of large size, but the exact weight of which, was unknown. The patient gave the date of the last menstruation in the present pregnancy, as December 5-9, 1915, and life had been felt on March 31. The spines measured

26 cm., the crests 28 cm., and the external conjugate 20.75 cm. The diagonal conjugate was 10 cm., and the estimated true conjugate 8.50 cm.

The patient was advised either to have labor induced at the end of the eighth month, or to have Cesarean section at term. The woman refused to have labor induced, and said she wished to see if she could not have a normal labor at term. I consented to this, provided she would come to the hospital when labor set in. It seemed to me that in all probability, she would again require section. On September 19, the first stage began at 9 P. M. and when first seen by Doctor Ingraham, resident obstetrician at the Woman's Hospital, at 1.30 A. M. September 20, the patient was having slight pains at infrequent intervals. The second stage began about 3 A. M. and rectal examination at 3.45 A. M. revealed the fact that the head was low in the pelvic cavity. It was deemed safest to apply forceps, and at 4.10 A. M. with the head in normal position, low in the pelvis, a few very easy tractions were made, and at 4.20 A. M. the woman was delivered of a 9 $\frac{3}{4}$ -pound male child in good condition. The biparietal diameter of the head measured 10 cm. The rest of the labor was normal, and after an uneventful puerperium, the mother left the hospital with her child, both in excellent condition.

I confess that I was amazed with the outcome of the easy labor, as the head was unusually large, and the pelvis was markedly contracted. Notwithstanding the excellent result obtained here, we are of the opinion, that when a Cesarean section has been previously performed and with factors present such as we have mentioned, large child, and small pelvis, it would be better as a rule, to perform an elective section, rather than to wait for possible normal delivery, with the possibility of rupture of the Cesarean cicatrix constantly in mind.

## 2. CESAREAN SECTION FOR CONTRACTED PELVIS, WITH TWIN PREGNANCY.

The patient came to me on August 8, 1916, stating that she had been pregnant twice before. The first pregnancy went to full term and she had been delivered of a dead child, after a difficult forceps operation. In her second pregnancy, labor had been induced, because of the difficulty in the first confinement, and also because of the fact that she had apparently progressed beyond term. Again the forceps was used, and a dead child extracted. Both children were large, but the weight was unknown. In the present pregnancy, the last menstruation, was December 23-28, 1915. Life had been felt on May 11, 1916, at about four and one-half months, and the patient was estimated for October 1, 1916. The spines measured 27 cm., the crests 29 cm., and the external conjugate 19 cm. The transverse, at the outlet measured 8 cm. Internal examination revealed a marked inlet contraction, especially on the right side, and the patient was advised to have Cesarean section at full term. On September 22, 1916, the membranes ruptured, and the patient started

at once for the hospital. Examination of the large abdomen showed twin pregnancy, the large head of one child resting under the abdominal wall, in the region of the umbilicus. Inasmuch as the children were of large size, and the pelvis markedly contracted, it was decided that the Cesarean section should be performed, as the patient was very anxious to have a living child. The classic operation was done, the first child being extracted by the head, which was lying directly under the incision. The second child was then removed, with no complications, the placenta was removed, and the uterine and abdominal wounds were closed in the usual manner. The children were females, weighing  $7\frac{1}{4}$  and  $6\frac{1}{4}$  pounds. The mother made an uneventful recovery, and left the hospital at the end of two weeks, with both children in good condition.

#### DISCUSSION.

DR. WILLIAM H. W. KNIPE, in opening the discussion, said: "I think that most of us feel that Cesarean section is not indicated in twin pregnancy and I imagine that most of us off hand would say so; still, every now and then we meet with a case where it seems that in that particular patient a Cesarean section is indicated. I had one about a year ago where we did a Cesarean section in a twin pregnancy, where a diagnosis was made beforehand; in our case there was a moderate contraction of the pelvis, a true conjugate of 8.5 cm. with a transverse presentation of one child and a prolapse of the cord; in other words, we felt that while we could probably deliver either one of those twin babies through that woman's pelvis, under the conditions present with a prolapsed cord and a transverse presentation, we felt that the safest thing for the woman was to do a Cesarean section. Still I think, as a general proposition, that twin pregnancy and Cesarean section do not go together. In other words, if you have a twin pregnancy it means that the children, as a rule, are undersized, and undersized children, as you know, go through contracted pelvises rather easily. I think that Dr. Brodhead did not mention the true conjugate in his case. (By Dr. Brodhead: "It was 8.50 cm.") Of course, no one can tell except the man who examines the patient whether a head will go through or not. I understood Dr. Brodhead to say the weight of the babies in his case was  $6\frac{1}{2}$  pounds for one and  $7\frac{1}{4}$  pounds for the other. Those are fair-sized children and while one would perhaps consider taking a child of that size through that pelvis, still with the fact that in this case it was complicated by a twin pregnancy and considering further the difficulty of manipulation, etc., I think that Dr. Brodhead was justified in doing a Cesarean section, as I felt we were justified in doing a Cesarean section in a case of similar character.

"The second case which Dr. Brodhead reports was one of normal labor following Cesarean section. Unfortunately, we have had the same thing happen to us. We have done Cesarean sections and then we have learned afterward that the second baby was delivered by some one else—or perhaps by ourselves—normally and easily



and a third baby the same way. Still I do not believe that we should censure ourselves on that account. Perhaps Dr. Brodhead will remember a certain case which we both saw with a contracted pelvis—a moderate contraction. The true conjugate was about  $8\frac{1}{2}$ . Dr. Brodhead thought that a Cesarean section was indicated. I saw the case and thought we could get the head through without doing a Cesarean section, and I argued rather strongly with Dr. Brodhead and he said, 'Well, go ahead.' I did an internal podalic version with a breech extraction, but could not deliver, and did a craniotomy on the after-coming head. In other words, my judgment was at fault. That baby had a very large head and the mother had hydramnios. We could not very well make out the size of the head before rupturing the membranes on account of the hydramnios, in fact, we were very much surprised to see the size of the head after doing the craniotomy. That same patient in her next pregnancy came along spontaneously without any induction of labor and had a perfectly normal delivery, and the third pregnancy went the same way. Our version and breech extraction and craniotomy proved that Dr. Brodhead's judgment was correct and that a Cesarean was indicated, and mine was wrong; still she went into labor spontaneously with the second and third child, delivering herself rather easily of normal-sized children.

"It comes down to a question between that particular baby and that particular pelvis. I have a case under observation at the present time with a true conjugate of 8 cm. that I saw a month ago and I felt that the woman would probably require a Cesarean section. The baby at that time seemed reasonably large and I felt that in a month it would be a good-sized head. Recently a practitioner in the lower part of the city, for the sum of twenty-five dollars, promised her a normal delivery in, I think he said, three or four hours. He had never examined her previous to his promise. I understand the patient has also visited one of our obstetrical institutions in this city and there she has also been told that she will not require Cesarean section, and I recognize that she may not. But with a generally contracted pelvis, now that I recall it, and a true conjugate of 8 cm., I do not believe with a normal-sized head that delivery will take place naturally, still she has the right to have a test of labor applied. Were we to do a Cesarean section in a case like this I think we would be perfectly justified. At the same time some one else is justified in giving her a test of labor. After all, those of us doing much obstetrics are very much surprised with the ease with which some heads go through certain pelves, and it is not the size of the head altogether but the moldability of the head which determines whether labor will proceed normally in a contracted pelvis."

DR. FREDERIC O. VIRGIN said: "I just want to ask a question. Statistics are always faulty. However, the essential fact to be determined is not whether a child will go through a pelvis of so many centimeters diameter, but whether a relative head will fit a relative pelvis. I would like to know if the  $x$ -ray has been used to

determine the relative size of the head and of the pelvis and if so, is it of any value?"

DR. WILLIAM H. W. KNIPE said: "I think I can answer that question. Dr. Isaac S. Hirsch, of Bellevue Hospital, took an  $x$ -ray about a week ago of the last case I mentioned and his diagnosis was that the patient required Cesarean section. I saw the  $x$ -ray plates and from my limited knowledge I do not think it is possible to tell whether the patient requires a Cesarean section or not. Although I believe that Dr. Hirsch, who is a very expert  $x$ -ray man, feels he can tell by taking an  $x$ -ray whether Cesarean section is indicated or not, I have not very much faith in its accuracy."

DR. WALTER M. BRICKNER.—"If the  $x$ -ray is to be of any value I think that a single radiograph would hardly be sufficient because you are apt not to see just the diameter that you want to measure, but it may be that a couple of stereoscopic radiographs would give a very good presentation of the relative diameters of the head and of the pelvis."

DR. BRODHEAD closing the discussion said: "The fetal head diameters, in an  $x$ -ray picture taken before labor starts, would not be of any value at all, because you should take into account the tremendous overlapping of the bones and the molding after uterine contractions have started."

DR. ROBERT T. FRANK presented a lantern demonstration and a series of plastic models illustrating the

#### ANATOMY, PATHOLOGY AND TREATMENT OF UTERINE PROLAPSE.

DR. FRANK said: "The lantern slides and models here shown graphically demonstrate the anatomy of the normal genital tract and its supports, illustrate the changes occurring in rectocele, cystocele and prolapse, and make clear the method of restoring the parts to functional usefulness. An extensive article covering the entire subject will appear elsewhere."

Two operations at once attained wide popularity—interposition of the uterus for cystocele, and isolated levator suture for rectocele—mainly, because they were planned upon an anatomical basis. Interposition necessitates ligation of the tubes, and although it holds back the bladder, it will allow the uterus to descend in prolapse unless the perineum is very firm. Isolated levator suture gives poor support, and leaves a tender scarry perineum.

The demonstration which follows attempts to place vaginal plastic repair upon a basis similar to that enjoyed by inguinal or femoral hernia. This necessitates knowledge of the anatomy, exposure of the structures to be utilized and their union by suture.

The anatomical structures used in the cure of cystocele are mainly fascial—triangular ligament and pubocervical "ligament" ("bladder pillars"). Those used in the repair of rectocele are both muscular and fascial—triangular ligament embracing between its layers the deep transverse perineus muscle, and levator (pelvic) and anal (superficial) fascia between which lies the levator ani muscle.

Rectocele anatomically is of three types, often occurring combined. Low rectocele is due to separation of the levator slings and tear of the rectal fascia. High rectocele may occur in two forms, one a sliding hernia of the upper rectum through Douglas' culdesac, the other a tear of the fascia and protrusion of the rectum, below the peritoneal reflection, but above the perineal body (which may be uninjured).

The technic described does not differ radically from that generally utilized; it does, however, show how to expose the essential structures, how to recognize and how to approximate them.

First and foremost the vaginal denudation, both in cystocele and in rectocele should be relegated to its proper importance or rather unimportance—that of a skin incision!

In operating for cystocele the flaps should not be mobilized more than  $\frac{1}{2}$  inch until the fascia ("pillars") is fully exposed by liberating the bladder from the cervix strictly *in the median line*. This prevents excision or buttonholing the fascia. When the fascia is exposed, the flaps are freed and then the bladder, which lies behind the "pillars" is liberated further. The pillars are sutured together and also fixed to the supravaginal part of the cervix.

Repair of rectocele falls into three varieties as its anatomy would indicate. Low rectoceles requires merely the apposition of triangular areas within the vulva, after the rectal fascia has been sutured. Hegar's triangular denudation will do as well as any other. Then the rectum is freed laterally on both sides for 2 inches without entering the fascial sheaths of the levator. A buried suture is now passed, starting laterally so as to penetrate the triangular ligament, where it meets the levator edge (about  $1\frac{1}{2}$ –2 inches within the vulva) at such a level as to narrow the vaginal canal sufficiently. This suture is introduced from without inward, and next takes hold of the rectal fascia below the edge of the denudation until it comes to the opposite levator edge, where it is passed through the levator edge and triangular ligament from within outward. When this suture is tied, the rectum is held back, and the fasciomuscular barrier is brought together and tightened. Next interrupted buried sutures unite the lower part of the gap, through which the rectum can be felt.

High rectocele of the subperitoneal variety is repaired by exposing the rectal fascia from the region of the cervix down to the perineal body. The edges of the fascia are united by buried suture, and then the perineal body is built up as previously described.

High rectocele of the sliding variety, which comes through the posterior culdesac between the cervix and the lower fixed portion of the rectum is treated by exposing the posterior peritoneal reflexion, just as is done as a first step in making a posterior vaginal section. The peritoneal reflection is opened, and then a purse-string suture is placed and tied as high up in the Douglas as can be reached. This step is much like the ligation of the sac in inguinal hernia. Next the cervix, sacrouterine ligaments and fascia of the anterior

rectal wall are drawn together by a subperitoneal suture, and then such further plastic work as may be indicated can be performed.

#### DISCUSSION.

DR. GEO. W. KOSMAK, in opening the discussion said: "I think that each case for which a plastic vaginal operation is indicated is a study by itself and that the sooner we can get away from any definite rules of operating after we leave our training school in the hospital the better it will be for us and the better it will be for our results. Dr. Frank's exposition of our errors was a very good one. I know I am going away from here with a little more respect for some of those anatomical structures than I had before.

"I wish that Dr. Frank would tell us in a few words about recent tears. I know it is a pretty hard matter to recognize any anatomical structures in primiparæ who have been in labor for prolonged periods and are then delivered, but even here I think it is an important thing to pick out individual structures, if we can, and restore the perineum to as near the normal condition as is possible. I feel that the average man when he repairs the perineum simply puts in a lot of sutures, ties them and whether the parts come together or not is largely a matter of chance. At the Lying-In Hospital I always call the attention of the staff and students to that grievous harm and that they must expose the perineum thoroughly in a good light and try to restore the structures, that they can bring the muscles and mucous membrane together and, above all, that they should repair tears in the neighborhood of the urethra which frequently escape observation and which may be very inconvenient things afterward."

DR. WALTER M. BRICKNER.—"What impressed me as newest in this presentation, both anatomically and surgically, was the demonstration of the pubocervical ligaments and the manner of repairing them in order to cure a cystocele. I would like to have Dr. Frank explain whether in multiparous women there is normally a midline separation of the pubocervical ligaments or whether they coalesce. I wish he would also explain the phenomenon of the production of cystocele, *i.e.*, in what way the ligaments are separated in childbirth."

DR. JOHN DOUGLAS.—"In Crossen's book on 'Operative Gynecology' he mentions the pubo-cervical ligaments and their particular importance in the operation for cystocele. It has always been comparatively easy for me to find the pubocervical ligaments and I consider it of great importance that they should be brought together in the repair of cystocele. In the repair of rectocele, however, I must say that I have not tried to find the triangular ligament, and while it is easy enough to bring the portions of the levator ani muscle together, I suppose that in doing so we gather up a certain amount of the triangular ligament where it is attached along the edges of the levator ani muscle. As far as deliberately attempting to find the triangular ligament to dissect it out, I think it would be very difficult, and as I look back I am sure I have never been conscious of finding anything which I would recognize as a definite structure representing the triangular ligament in the repair of the perineum.

DR. W. H. W. KNIFE said: "I think all the men at the Sloane might with profit take the Huntington Course No. 32 on the female pelvic viscera. It was my good fortune to take that course in my fourth year in medical school. When we dissected out by that method the female pelvis it was entirely new to me. We had formalinized specimens and spent considerable time dissecting out the various pelvic muscles. Until then my idea of the pelvic floor came from reading Gray's Anatomy and not reading that very much, but the operation for rectocele which Dr. Frank has mentioned to-night is harking back, it seems to me, to the time I was on the gynecological service at Roosevelt Hospital in 1903-05. We did the exact operation which Dr. Frank has mentioned to-night and we did it in practically the same way. As a matter of fact, we did what I think Dr. Frank is doing now; that is, grasping all the fascia and the muscle together without distinctly separating the muscle, bringing it, as Dr. Frank has demonstrated tonight, together, sewing it in the middle line and getting what we felt were pretty good results. I do this operation and must say that I think it is a logical operation. The operation for cystocele which Dr. Frank has so beautifully demonstrated is also a logical operation. In former years we used to take an elliptical portion of the anterior vaginal vault away and sew the denuded edges together. From an anatomical point of view this is absurd. The operation which Dr. Frank has shown here is one which I think we can all follow. I think perhaps some of us have been doing that particular operation a few years. Now, I would never think of doing a cystocele operation without going well out and separating the bladder very thoroughly. I think that it is an important point not to separate the tissues, but to go well up and out on the side and get a good portion of the ligament which Dr. Frank has demonstrated. It seems to me a reasonable operation."

DR. FREDERIC O. VIRGIN.—"I just want to suggest that possibly a number of us have fallen into the fault which Dr. Frank pointed out when he suggested that it required a very delicate and very careful fascial separation of the vaginal wall. I have seen a good many denudations done where scissors were used and used very rapidly under the stress of hurrying the thing, and I wonder if sometimes a good deal of this fascia isn't cut away with the denudation and that may explain some of the faults in the after-results. I think Dr. Frank's suggestion that the first initial cut should be a very gentle affair is of much value. I think it would be hard for me to identify the fascia. It looks very beautiful when you see it in yellow and red, but under your eye in the operating field it is a very different proposition to identify those fine structures and I think it is very possible that many times all the fascia is destroyed so that when the stitches are sewed in there is no fascia at all."

DR. ROBERT T. FRANK in closing the discussion said: "In my presentation I was hurried and many points have not been touched upon. For instance, I did not tell you that in the case of a complete prolapse I always end the operation by doing a ventral fixation,

or if more children are wanted an Alexander's operation. There are many other points which I either did not mention or dwelt upon very lightly. In answer to the questions asked in the discussion, I might say to Dr. Kosmak that I have always thought that trying to do a delicate repair of the vaginal canal after the trauma of labor would be comparable to a surgeon trying to do a fine muscle and fascia repair after a child had been run over by an automobile. Because of the fact that the tissues are crushed, hemorrhagic, etc., anatomical repair is hardly conceivable. I take deep sutures laterally and try to bring the retracted tissues together, that is all I hope for.

"As regards Dr. Brickner's question I would say that the pillars normally in multiparous women form a complete tendinous or rather fascial barrier. They do unite in the middle line. There is no distinguishing point in the middle line dividing it into two pillars unless separation is caused by trauma.

"To Dr. Douglas I would say that I make no attempt to expose the triangular ligament nor has it ever come into view the way he suggested. As a matter of fact I simply know that if this suture is placed in the correct position, about 2 inches from the outside of the vulva, that it will take in these various structures. When you pull at this point the levator edge becomes quite distinct, and likewise if you pull inward and toward the median line you will find that you meet with unexpected resistance, which is due to traction on the triangular ligament.

"With regard to Dr. Knipe's remarks I wish to say that I do not attempt to enter the fascial sheath and expose the levator as was formerly done. In fact, if as occasionally happens, the fascia is injured accidentally during the exposure of the levator I carefully sew up the rent before applying the purse-string suture. I make no attempt to define structures more than to expose the place in which they are situated, and to do this it is necessary to know the anatomy, and then when this exposure has been made I bring the tissues into broad apposition and try to avoid including a lot of fat or any other alien structures just the way you would proceed in doing a hernia. You want to get the fascial structures together, the muscle naturally follows the fascia."

## REVIEWS.

**EMBRYOLOGY, ANATOMY, AND DISEASES OF THE UMBILICUS, TOGETHER WITH DISEASES OF THE URACHUS.** By THOMAS STEPHEN CULLEN, Assistant Professor of Gynecology in the Johns Hopkins University, Assistant Visiting Gynecologist to the Johns Hopkins Hospital. Illustrated by Max Brodel. 269 Illustrations and 7 Full-page Plates. Large 8vo. of 680 pages. W. B. Saunders Company, Philadelphia and London, 1916. Cloth, \$7.50 net. Half Morocco, \$9.00 net.

When you first hear the title of this book and that it is a large octavo of six hundred and fifty pages you think: "What a small subject to write so large a volume about!" but when you look over the work itself you humbly admit that the littleness was yours and become lost in admiration, for Dr. Cullen has produced a work monumental in scope and character and a model in scientific thoroughness and accuracy for all medical authors in the future to study and profit by.

It represents the result of eight years of intensive and scrupulously careful research work. The assembling of the literature of the subject alone and its critical study took all of three years and was made possible only by the facilities of the Surgeon-General's Library at Washington. As an example of the care taken in its production, when the book was set up in galley, the author, realizing that the tremendous number of cases mentioned would be most valuable with the fewest chances of error, had the entire book checked off with the original articles. Subsequent writers can accordingly feel safe in relying on the accuracy of the cases recorded.

The work begins with chapters on the Embryology and Anatomy of the umbilical region, which fill the first seventy pages and are beautifully illustrated in color, and goes on with continued interest through chapters on Umbilical Infection in the New-born and some forty other lesions to the concluding chapter on Tuberculosis of the Patent Urachus. A the beginning of each chapter a synopsis of the subject is given and then the cases are cited more or less in detail. The classification of the material and the interpretation of the diagnoses in the light of our present knowledge of pathology is admirably done. The book is packed full of facts not to be easily found elsewhere and is of great interest to every medical man.

Most of the original illustrations are by that master in medical art, Max Brodel, Director of the Department of Art as Applied to Medicine, at the Johns Hopkins Medical School, and are models of clearness and beauty.

The cost of the production is said to have been over forty thousand dollars. The paper, type, and presswork reflect great credit on the publishers and the book itself will be an enduring monument to its author.

**A TEXT-BOOK ON THE PRACTICE OF GYNECOLOGY FOR PRACTITIONERS AND STUDENTS.** By WILLIAM EASTERLY ASHTON, M. D., L. L. D. Professor of Gynecology in the Graduate School of the University of Pennsylvania; Fellow of the American Gynecological Society; one of the Founders of the *Congr s International de Gyn cologie et d'Obst trique*; formerly Professor of Gynecology in the Medico-Chirurgical College, Philadelphia; formerly Lecturer on Gynecology in the Jefferson Medical College, Philadelphia, and so on. With ten hundred and fifty-two new line drawings illustrating the text. pp. 1096. 8vo. Sixth revised edition. W. B. Saunders Company, Philadelphia and London, 1916. Cloth \$6.50 net. Half Morocco \$8.00 net.

The sixth edition of this popular text-book shows evidence of careful and thorough revision and seems in every way up to date. Changes are found in practically every chapter, especially in the sections on etiology, pathology, and treatment. The chapters on microscopical examinations of tissues and secretions, examination of the abdomen, and on constipation have been considerably changed. The use of argyrol is advocated in the treatment of vulvar herpes. Much attention is given to the early diagnosis of cancer from the standpoint of the family physician, a consideration which it is hoped may result in a diminution of the mortality from this disease. Important additions are made in the discussion of neoplasms of the bladder, menstrual disorders, sterility, perineal lacerations, and shock.

The book is exceedingly practical and explicit, takes nothing for granted, describes only the one operation for each condition which the author has found most satisfactory, but describes that one in detail and for these reasons will continue to be a favorite with the practical man.

**MECHANISM OF GROWTH IN CROWNGALL.** By ERWIN F. SMITH, Pathologist in Charge, Laboratory of Plant Pathology, U. S. Department of Agriculture. 4vo., pages 186, 64 plates. Reprint from *Journal of Agricultural Research*. Washington. Government Printing Office, 1917.

The ultimate cause of cell proliferation in Crowngall is the *Bacterium tumefaciens*, but the immediate cause must be chemical or physical. The author holds growth to be the normal function of cells held in check by normal inhibitions. The removal of these causes unlimited proliferation, which is cancer. He sees in the surface tension of cells a local inhibition, the removal of which by local increase in osmotic pressure brings about cancer. Thus it is a physical phenomenon. In Crowngalls the removal of growth-inhibitions is by the physical action of substances liberated within the tumor cell as a result of the metabolism of the bacteria.

The most conspicuous of these substances are ammonia and alcohol. The author injected small quantities of ammonia into castor oil plants and obtained striking proliferations.

He obtained similar proliferations with various dilute acids. He



concludes that these are not simple repair proliferations. He thinks that any soluble substance, except a killing, a plasmolyzing, or an oxygen-absorbing substance would be competent to induce tumor formation. He is convinced that the growth would have gone on indefinitely if the chemical substances could have been applied slowly and continuously.

**THE AMERICAN YEAR-BOOK OF ANESTHESIA AND ANALGESIA.** By Various Contributors. F. H. McMECHAN, A. M., M. D., Editor. Quarto; art buckram; India tint paper; 420 pages and 250 Illustrations. Surgery Publishing Company, 92 William St., New York, 1916. Price \$4.00.

The work referred to has been published in order to provide a medium for the more scientific phases and technical developments in the field of anesthesia and analgesia. It is essentially a volume of annual progress and the articles have been contributed by specialists in various lines. It is hoped in succeeding volumes to include collective abstracts in a comprehensive form. The articles are all of interest but particular attention may be called to those on nitrous oxid in obstetrics and alkaloidal amnesia in obstetrics.

The quotations inserted, presumably by the editor, at the conclusion of each article are worthy of favorable comment and their selection is individually most opportune and appropriate. The editorial labors in general as shown in the book are also worthy of particular note. Dr. McMechan is to be congratulated on the initial issue of what we trust will be an annual presentation of this most important subject.

**MORTALITY FROM CANCER AND OTHER MALIGNANT TUMORS IN THE REGISTRATION AREA OF THE UNITED STATES.** A Monograph issued by the Department of Commerce, Bureau of the Census. SAMUEL L. ROGERS, Director. Quarto of 212 pages. Washington. Government Printing Office. 1916.

This monograph presents, in greater detail than heretofore shown in the annual mortality reports of the Bureau of the Census, statistics of deaths occurring in the registration area of the United States during the calendar year 1914 and reported as due to cancer and other malignant tumors. The preparation of this monograph was authorized by the Director of the Census in compliance with the suggestion of a number of the foremost students of the cancer problem and at the request of the American Society for the Control of Cancer.

In the preparation of the tabular matter included in the volume the bureau has subdivided the seven titles of the International List of the Causes of Death, covering the subject of cancer, so that the statistics show the mortality from cancer and other malignant growths, classified according to location, under twenty-nine separate headings. At the suggestion of a member of the Society for the Control of Cancer two sets of statistics are presented, showing (a) growths of which the existence and malignant nature were reason-

ably certain on the basis of autopsies, surgical operations, microscopical examinations, or accessibility to observation by reason of exposed situations; and (b) those of which identification as malignant tumors was uncertain, that is, internal cancers and other malignant growths, diagnoses of which were based on clinical findings only.

The first step in preparation for the tabulation was to make an estimate of the percentage of the transcripts, as received by the Census Bureau, which contained the desired information. It was estimated that at least 50,000 deaths in the registration area would be reported during the year 1914 as due to cancer. About 2000 transcripts from several registration states were examined and it was found that in less than 2 per cent. of the cases was the fact of autopsy mentioned, that about 9 per cent. of the transcripts contained the information that surgical operations had been performed, and that in practically no cases was it stated that the diagnosis was based on clinical findings. For the entire 50,000 cases, there would thus be, on the basis of the data on the 2000 transcripts of death certificates examined, about 11 per cent., or approximately 5500, in which surgical operations or autopsies had been performed. Using as a criterion the mortality statistics for 1913, it was estimated that about 8500 deaths would be reported as due to cancers of the buccal cavity, skin, and breast, all so situated that no mistake would be probable in diagnosis, and that these, therefore, could be classified as of reasonably certain malignancy. There would thus be a total of 14,000 cases in which the diagnosis could be safely accepted as reasonably certain, leaving some 36,000 in which it was necessary for the Bureau of the Census to communicate with the attending physicians in order to ascertain whether the diagnoses were based on clinical findings or on autopsies, or whether surgical operations had been performed.

A circular letter was, therefore, prepared and sent to over 35,000 physicians, of whom about 80 per cent. replied.

As a result of this investigation the bureau was able to compile 30,555 deaths, or 58.3 of the total, under the caption "Diagnosis reasonably certain:" 14,404, or 27.5 per cent. under "Diagnosis uncertain:" and 7461, or 14.2 per cent. under "Diagnosis unknown." In editing the replies of the physicians a considerable number of cases were noted of which the following is an example: The return was "Cancer of the Liver." The physician replying to the Census Bureau inquiry as to basis of diagnosis stated that, so far as the liver was concerned, the diagnosis was purely clinical, but that prior to this a cancer of the breast had been excised; or that the decedent had suffered for years from a malignant tumor of the rectum, the uterus, the axilla, the face, or some other visible or accessory organ or member. The bureau in classifying such a case was, therefore, confronted with this situation: (a) The existence of cancer was certain or reasonably certain in the visible or accessory organ or member; (b) the existence of cancer in the inaccessible organ was confirmed by clinical symptoms only; (c) the executive council of the American Society for the Control of Cancer, in conjunction with representatives of other interested organizations and persons, had

recommended "that all diagnoses of inaccessible cancer based on clinical findings alone should be referred to the uncertain class regardless of any strength of assertion by the physician that the diagnosis was correct." Under these conditions it was decided to classify the death as one caused by cancer of the visible or accessible organ, it being deemed better to establish as nearly as possible the number of deaths in which it was reasonably certain that the cause was cancer, than to tabulate under the head of cancer of any given organ, deaths which were declared by the society to be uncertain as to cause by reason of the fact that the diagnosis was based on clinical findings only.

Under the head, "Diagnosis uncertain," are included cases where the growths were inaccessible, no operative measures were employed, and the diagnoses were based on clinical findings only, even though they were concurred in by consultants, and even though physicians of most eminent professional standing positively asserted that they were sure of their diagnosis.

Under "Diagnosis unknown" are compiled all cases concerning which correspondence with physicians was necessary and concerning which no replies were received to the letters of the Bureau of the Census.

With the beginning of the annual mortality reports—the first of which related to the year 1900—the percentage of population included in the registration area was 40.5 per cent. This percentage had increased to 66.8 in 1914.

Of the 52,420 deaths reported in the registration area in 1914 as caused by cancer and other malignant tumors, 21,282, or 40.6 per cent. were males, and 31,138, or 59.4 per cent. were females; and 50,515 or 96.4 per cent. were white, and 1905, or 3.6 per cent. were colored. The estimated population of this area was 65,989,295. The cancer death rate for the year was, therefore, 79.4 per 100,000 of population, the highest on record since the establishment of the registration area.

Among the registration states the highest rate (109.9) was that for Vermont, which state also had the maximum rate in 1913. In Maine the rate was 107.6; in Massachusetts, 101.2; in New Hampshire, 100.8; and in California, 97.9. The same five states showed the highest rates in 1913, although not in the same order. The lowest rate among the registration states in 1914 was that for Utah, 45.8; next in order were Kentucky, with 46; Virginia, with 48.9; Montana, with 51.5; and North Carolina, with 57.8. (For the last-named state the figures relate only to municipalities having 1000 or more inhabitants in 1910.)

Among the cities of 100,000 population or over in 1910, the highest five death rates for cancer in 1914 were shown for the following: Albany, 146.7; San Francisco, 128.4; Boston, 118.7; New Haven, 113.5 and Worcester, 111.6. The lowest five rates were those for Birmingham, 46.3; Fall River, 55.8; Atlanta, 59.1; Scranton, 60.1; and Milwaukee, 69.4.

Although a large amount of additional labor has been thrown upon the Division of Vital Statistics of the Census Office by the prepara-

tion of this report, it is believed that the trouble and expense will be more than repaid by the result. Much of the valuable knowledge of the disease which we possess to-day has resulted from the collection and comparison of statistical data, and this method must be relied upon, side by side with experimental research and clinical observation, to elucidate the baffling problem of the nature and cause of this disease. The publication of this report by the Census Bureau should bring out new and useful information as to the prevalence of the disease in the United States and thereby contribute to the better understanding of its controllable features. Such a study as the Census Bureau is making, if continued, should also throw clearer light on the question of whether or not cancer is really increasing. The foremost authorities have repeatedly urged that this question can be scientifically answered only by studying separately the facts in regard to each of the many forms and sites of malignant disease. The Imperial Cancer Research Fund has coöperated with the Registrar-General of England and Wales in a thorough analysis of the detailed figures for cancer of the stomach, cancer of the tongue, cancer of the breast, etc., for successive years. By the progressive action of the Director of the Census similar data as to parts of the body affected on which such studies can be made will now become available for the first time in the official statistics of the United States.

The new plan will not only produce data for the year 1914, but every future year a vast amount of information will be recorded and stored away, and can be compiled and published when the demand warrants. Efforts are also being made further to coördinate the work of the State and Federal statistical offices for the better registration of deaths from cancer and other diseases as well. By the operation of this plan and the mutually supplementary efforts of the national and State registration officials, it will be possible permanently to record and study the extensive American data on cancer mortality, with all the detail required by the most exacting statistical methods.

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## ITEMS

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The second examination to be given by the NATIONAL BOARD OF MEDICAL EXAMINERS will be held in Washington, D. C., June 13, 1917. The examination will last about one week.

The following states will recognize the certificate of the National Board: Colorado, Delaware, Idaho, Iowa, Kentucky, Maryland, North Carolina, New Hampshire, North Dakota and Pennsylvania. Favorable legislation is now pending in twelve of the remaining states.

A successful applicant may enter the Reserve Corps of either the Army or Navy without further professional examination, if his examination papers are satisfactory to a Board of Examiners of these Services.

The certificate of the National Board will be accepted as qualifica-

tion for admittance into the Graduate School of the University of Minnesota, including the Mayo Foundation.

Application blanks and further information may be obtained from the Secretary, Dr. J. S. Rodman, 2106 Walnut Street Philadelphia.

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#### ARMY MEDICAL CORPS EXAMINATIONS.

The Surgeon General of the Army announces that preliminary examinations for appointment of First Lieutenants in the Army Medical Corps will be held at convenient points the first Monday in each month. Full information concerning these examinations can be procured upon application to the "Surgeon General, U. S. Army, Washington, D. C."

The essential requirements to secure an invitation are that the applicant shall be a citizen of the United States, shall be between twenty-two and thirty-two years of age at the time of commission at the close of the Army Medical School, a graduate of a medical school legally authorized to confer the degree of Doctor of Medicine, shall be of good moral character and habits, and shall have had at least one year's hospital training as interne after graduation.

Graduate physicians who are serving their internship and who meet the other requirements can be examined for appointment with the understanding that they will complete the required postgraduate hospital internship before coming to the Army Medical School.

Those who qualify at their preliminary examination and complete their hospital internship by July 1 will be ordered to the Army Medical School for the special session of the school commencing July 9. The regular session of the school will open October 1.

In order to perfect all arrangements for the examination, applications should be completed at the earliest practicable date.

There are at present 230 vacancies in the Army Medical Corps. After July 1, there will be 222 additional vacancies.

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## BRIEF OF CURRENT LITERATURE.

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### OBSTETRICS

**Control of Nausea and Vomiting of Pregnancy by Intramuscular Injections of Corpus Luteum Extract.**—J. C. Hirst (*Jour. A. M. A.*, 1916, lxvii, 1848) argues that every woman, during the period of sexual activity, is constantly absorbing corpus luteum. No sooner is the corpus luteum of one menstruation disposed of, than another appears to take its place. With the onset of pregnancy, this absorption ceases. The corpus luteum of pregnancy constantly increases in size, until it reaches its acme about the third month. From this time on, it is gradually absorbed. The nausea of pregnancy, begin-

ing during the period of nonabsorption, disappears about the time that the corpus luteum begins to decrease in size. Is it not reasonable to assume that this is not coincidence, but cause and effect, and that the corpus luteum plays an important part in relation to the nausea? Based on this idea, corpus luteum extract was administered intramuscularly in thirty-six consecutive cases. It was successful in controlling the nausea and vomiting in thirty-two of these. Of the successful cases, two were of the pernicious type, in which the vomiting was so severe that the termination of pregnancy was seriously considered. The smallest number of doses in any successful case was four, the largest, forty-two; the average number of doses required, eleven. In the average case of nausea, in which it amounts only to discomfort, and the vomiting is limited to one or two morning attacks, the patient will usually respond to a dose of 1 c.c. every other day for five or six doses. Particularly is this true in the cases in which the nausea has begun to decline. In the more severe cases, when nausea is constant, and the patients are subject to frequent paroxysms of vomiting at any time during the day, the dose should be 1 c.c. daily for from twelve to fifteen doses. During the period of treatment, the patient's activity should be curtailed, and as much rest as possible is essential. In the pernicious cases, the writer has given 1 c.c. twice daily, and would not hesitate to give 2 or more c.c. to a dose in severe cases. All injections are given deep, into the muscle, and *never* subcutaneously. The material used is in ampules, containing  $\frac{1}{8}$  grain of soluble corpus luteum powder in 16 minims of physiologic salt solution saturated with chlorbutanol for its local anesthetic effect. This amount is equivalent to  $2\frac{1}{2}$  grains of desiccated corpora lutea. A curious fact is the sedative action in markedly neurasthenic cases. Not only was the nausea improved, but also the patient's nervous phenomena. The dizziness, headache and other nervous manifestations of early pregnancy seemed to be remarkably controlled.

**Action of Veratrone in Treatment of Eclampsia.**—W. F. T. Haultain (*Edinb. Med. Jour.*, 1916, n. s., xvii, 416) states that we have in veratrone a drug of the utmost value in the treatment of eclampsia, as shown by its success in the treatment of thirty-eight consecutive cases. After the initial dose of 1 c.c. subsequent doses should be regulated by the blood pressure of the patient, as by so doing it can be given with safety and to the greatest advantage. The dosage appears to be as follows: Prophylactic dose, the patient never having had fits, but eclampsia imminent, 0.25 c.c. daily. Prophylactic dose, the patient having had fits and having been cured of these—0.25 c.c. to 0.5 c.c. daily. Dose when the patient has eclampsia and the fits are occurring—1 c.c. on admission and 1 c.c. after each fit.

# DEPARTMENT OF PEDIATRICS.

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## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON PEDIATRICS.

*Meeting of February 8, 1917.*

ROGER H. DENNETT, M. D., *in the Chair.*

DR. ABRAHAM ZINGHER presented the results of an investigation by DR. WILLIAM H. PARK and himself on the

#### DURATION OF ANTITOXIC IMMUNITY IN MAN AND ANIMALS AFTER DIPHTHERIA TOXIN-ANTITOXIN INJECTIONS.

Active immunization has for a long time been the subject of investigation. More than twenty years ago Dziergowsky was able to produce immunity by the administration of small amounts of diphtheria toxin, but the carrying out of his method required a long period of time and was not practical. The attempt had also been made by Dziergowsky to produce immunity by applying diluted diphtheria toxin by means of a saturated pledget of cotton to the mucous membrane of the nose, but this was found to produce local membranous lesions and sometimes necrosis. Attempts to produce immunity with toxin-antitoxin were made in horses by Park as far back as 1898, and in guinea-pigs by Theobald Smith. He found that the immunity in the mother guinea-pig was transmitted to the offspring. It was not used in human beings until 1913, when v. Behring and his colleagues published their results.

We also have found that toxin-antitoxin mixtures will produce a considerable amount of immunity in animals and have applied this method of immunization to children and adults. In our work we soon realized that children immunized with toxin-antitoxin mixtures fell into two groups. The one group comprises those who possess a certain amount of natural immunity; that is, a certain amount of antitoxin was present in their blood naturally; when the toxin-antitoxin was injected into these children they responded by producing a large amount of antitoxin within ten days or two weeks. The second group comprised those children who had no natural immunity and the majority of whom responded to the toxin-antitoxin injections only at the end of a longer period of time. Twenty-five or 30

per cent. responded by producing some antitoxin at the end of three or four weeks after the injections. This was less in amount, however, than was produced by those having a small amount of antitoxin in the blood before the immunizing injections.

In testing the efficiency of toxin-antitoxin only those children who had no natural antitoxin (positive Schick cases) in their blood were selected and immunized.

It was found that only a certain proportion of these children developed a definite immunity by the end of the second or third week after the injections, but that a much greater number became immune by the end of the second or third month.

A series of scarlet fever patients who had a positive Schick test were given the toxin-antitoxin and tested at various intervals afterward. About 30 per cent. responded by developing antitoxin at the end of three weeks, by the end of four weeks an additional number had responded, and by the end of the seventh week a still larger percentage had developed antitoxin. The greatest increase in the number of individuals who developed an active immunity, seems to take place between the sixth and seventh week after the injection.

We have also tested over 20,000 children in different institutions and have immunized 1000 that showed no natural antitoxin in the blood (positive Schick cases). These 1000 were retested at the end of three, six, and twelve months after the injections. The effect of varying the number of doses, from one to three was also studied. We found that the best results were obtained after administering three doses; about 95 per cent. of the children were thereby immunized successfully and gave a negative Schick retest at the end of three months. The three injections were given subcutaneously about a week apart. Most of the work was carried on in institutions by a single observer in order to eliminate any error from the personal equation. The number of children retested did not correspond to the number of children immunized owing to the fact that some of the children were discharged from the institutions.

The mixtures of toxin-antitoxin were of varying degrees of toxicity. A slightly toxic mixture was used consisting of 80 to 90 per cent. of an L + dose of toxin to one unit of antitoxin, *e.g.*, from  $1\frac{1}{4}$  to  $1\frac{1}{8}$  units of antitoxin to one L + dose of toxin. Another mixture, which was neutral, was also used. This mixture consisted of about 65 to 80 per cent. of an L + dose of toxin to 1 unit of antitoxin, or  $1\frac{1}{4}$  to  $1\frac{1}{2}$  units of antitoxin to one L + dose of toxin. A third mixture was also used in the beginning of our work which was slightly overneutralized. This mixture consisted of about 50 to 65 per cent. of an L + dose of toxin to 1 unit of antitoxin, or  $1\frac{1}{2}$  to 2 units of antitoxin to one L + dose of toxin. The toxin was not diluted in any way, the mixtures being prepared by the addition of concentrated antitoxin to diphtheria toxin. It was important that in the stronger mixture there should be only a very slight excess of toxin. On testing a mixture it is our custom to inject two guinea-pigs, one with 1 c.c. and a second one with 5 c.c. of toxin-antitoxin. Even the slightly toxic mixture should not kill a guinea-pig acutely from



diphtheria toxin. The mixtures have to be very carefully prepared, but when thus prepared are perfectly harmless. We have found that from 10 to 20 per cent. of the individuals receiving the toxin-antitoxin injections give local reactions and a temperature of 100 to 103° F., which soon subsides. If we get a very severe reaction it is not due to the free toxin, but is rather due to the protein of the diphtheria bacillus.

If there is doubt as to whether a Schick reaction is a pseudo-reaction, one may make an injection on the other arm with toxin that has been heated to 75° C. for five minutes; the heating destroys the diphtheria toxin but does not affect the bacillus protein. The pseudoreaction comes on early, reaches its height in twenty-four hours and disappears by the third day. The true Schick reaction comes on about twenty-four hours after the injection and is at its height on the third or fourth day; it then passes through characteristic stages of pigmentation and desquamation.

With reference to animals, it may be stated that the horse, which is a good antitoxin producer, reacts to toxin-antitoxin injections very much like a human being who has a natural immunity to diphtheria. One group of our horses received single injections of toxin-antitoxin and bleedings were made daily thereafter. There was no perceptible increase in the antitoxin content of the blood until the sixth day, when a distinct increase was noted, and subsequent bleedings showed that the height of the antitoxin content of the blood was reached by the second week.

Guinea-pigs act like human beings, who have no immunity (positive Schick cases); it is only at the end of two months after toxin-antitoxin injections that they show a distinct antitoxin production. Out of a series of twelve guinea-pigs, only two gave a negative Schick test at the end of one month, while eleven out of the twelve showed a negative Schick test at the end of two and one-half months.

A study of the curve of antitoxin production in nonimmune human beings shows that it usually begins at about three weeks after toxin-antitoxin injection; at the end of four weeks about 40 per cent. have responded by the production of antitoxin, and by the end of six to eight weeks about 80 to 95 per cent. are producing antitoxin.

A study of the duration of active immunity in animals shows that when they once become immune they continue to be immune. Our experience with human beings warrants the statement that active immunity once produced lasts at least two years; we will continue to test these children at intervals to determine how long this protection lasts.

We have found that when animals who at first slowly develop antitoxin after the first injection of toxin-antitoxin receive a second injection, they develop a very much larger amount of antitoxin even within ten days to two weeks. It seems that when the cells are once sensitized by a primary injection and a second dose is subsequently given, antitoxin will be developed much more rapidly. Experiments along this line suggest that it may possibly be advisable

to give a first injection of toxin-antitoxin to human beings, then do a Schick test at the end of three months and at this time, if necessary, give the second and third doses. The first dose would thus sensitize the body cells and the following doses would result in a rapid production of antitoxin.

Active immunization of susceptible children has been taken up in New York City in some of the schools, day nurseries and milk stations.

Also a rapidly increasing number of orphan asylums and infant homes is taking advantage of the Schick test and active immunization with toxin-antitoxin not only to control outbreaks of diphtheria but also as a general prophylactic measure.

A large majority of the children who originally showed that they were naturally immune to diphtheria by giving a negative Schick test, continue to show a negative test. As far as our own experience goes, the negative Schick test persists for several years, and possibly through life. This is a very important fact, and indicates the value of carefully preserved records of the Schick test for each child.

In reply to Dr. Ayer's question as to whether a child that shows a pseudoreaction should be immunized, Dr. Zingher emphasized the fact that these children were immune, and that the injections of toxin-antitoxin were even contraindicated on account of the rather severe local reactions. There are individuals who show a combined true and pseudoreaction, and these individuals are not immune. The pseudoreaction is a reaction to the autolyzed protein of the diphtheria bacillus. There are a few children who show the combined reaction, most of them, however, show either a true or a pseudoreaction. At certain age groups there are larger percentages of true reactions than at others; for instance between the ages of two and four years about 39 to 40 per cent. give a positive Schick test. The Schick test is extremely valuable in showing which children need to be immunized. We have found in institutions that about 85 per cent. of children between five and fifteen years, have a natural immunity so that only about 15 per cent. require immunization.

DR. COLMAN W. CUTLER read a paper on

#### STRABISMUS.

An infant's eye is undeveloped at birth. It is far-sighted or hypermetropic, the parallel rays being focussed behind the retina, so that even very distant objects are not clear without focussing. There is, however, in childhood a strong power of accommodation which makes the focussing of distant objects possible with an effort out of proportion to the amount of effort applied to convergence with which function accommodation is coördinated. It is important to remember, then, that the child's eye, because it is far-sighted, makes an effort of accommodation when looking at objects at all distances greater than the effort required for convergence for the same distance. In other words, the effort applied to convergence is

greater than is needed, and as it keeps pace with accommodation, the unstable attempt at binocular vision is relinquished in behalf of the clearer vision obtained by increased accommodation, and the eyes cross, one eye continuing to fix the object while the other converges excessively, and strabismus results. If the eyes are equal either may fix in turn and we have alternating strabismus; if one is in anyway inferior, the better eye tends to assume the active fixation and the squint is unilateral. If, however, one eye dominates, the squinting eye fails to develop or is suppressed and the condition known as amblyopia exanopsia occurs.

Myopia is the converse of hypermetropia. It occurs rarely in young children, but is prone to develop during the school age and the divergence or lack of convergence which is sometimes associated with it depends chiefly on the lack of accommodation which myopia entails, and which is excessive in hypermetropia.

The divergent squint of myopia is usually alternating unless one eye is inferior, therefore, amblyopia does not occur. Full correction of the myopia under atropin restores the dynamic accommodation and it is often possible to develop fusion and convergence by means of prism exercises. Prisms should not be worn, however, in any case as they take the place of the effort to converge and increase the divergence. In most instances of confirmed divergence an operation will be needed to reinforce the function of convergence which tends to become weaker as the child grows older. The operation should be an advancement of one or both internal recti muscles.

Inequality of the eyes (anisometropia) should be corrected by glasses.

Opacities of the cornea or other organic defects of one eye may be associated with strabismus which will be convergent if the fixing eye is hypermetropic and divergent if it is myopic.

Heredity plays an important part in the etiology of strabismus, some authors placing its influence as high as 50 per cent., and this is not surprising, as hypermetropia, myopia and astigmatism are influenced in a similar manner.

The nervous and central factors involved in strabismus are more obscure than the peripheral optical and muscular relations, but they are even more interesting. The conditions essential for binocular vision are the predominance of the central region of the retina, the macula, which leads each eye toward the object seen, and the impulse to see things as they are, singly, to fuse the two impressions into one. The distinction between the center and the periphery of the retina is not fully developed at birth, but is the result of the growth of retinal elements and nerve fibers by which the macular region gains in perception.

The fusion faculty is also a later acquisition, probably a part of the sensory education which underlies all knowledge gained by experience. Claude Worth, whose observations are most authoritative on this subject states that he has found distinct evidence of binocular vision in the sixth month. Normally the development of the fusion faculty is well advanced by the twelfth month and complete before

the end of the sixth year. He states that in analyzing 1017 cases he has found that 75 per cent. of his cases of unilateral squint developed before the end of the fourth year, and in only 7½ per cent. was its advent delayed after the sixth year. During these early years it is evident that diseases like whooping-cough, or occasions of emotion or stress, may easily upset the unstable equilibrium and produce the sudden onset so often noticed of a condition for which the predisposing influences have long existed.

The delicate and complicated process of fusion may be disturbed in several ways: Any interference with the vision of one eye, such as astigmatism or opacities of the cornea, which may occur and pass almost unnoticed, may yet leave a permanent defect, and these brief and apparently insignificant attacks of corneal inflammation should receive far more attention from the general practitioner.

Congenital defects within the eye or paralysis of ocular muscles or birth injuries may prevent the normal development of binocular vision, but this group is essentially different from those under consideration in which the muscles were not originally at fault, and the squint develops as the result of an attempt to adjust disordered relations between the functions of accommodation, convergence and fusion.

Hypermetropia is an obstacle which must be overcome by an effort of accommodation, and the effort applied is often out of proportion to the purpose with the result that an actual hypermetropia may simulate myopia, so that atropine is needed to discover the full extent of the far-sight and to make possible its correction by convex glasses. It is obvious that the glass takes the place of the accommodative effort or spasm, and that the associated convergence may be relieved in this manner if the glass is given before the habit of squinting is established. The simulation of myopia by hypermetropia may lead to serious errors in the giving of glasses, which instead of relieving the spasm increase it and the associated convergence. Such errors are not rare in these days of optometry.

If the squint becomes unilateral, the vision in the squinting eye fails rather rapidly and amblyopia from disuse develops and becomes fixed. The first therapeutic effort therefore, after the correction of refractive errors, is to revive the functional activity if the case is seen early enough, by depressing the function in the dominant eye and then by the development of the fusion sense to restore binocular vision. In neglected cases, and there are too many of these, the vision in the squinting eye remains seriously impaired, from one-third to one-tenth of the normal, and in many instances fixation is lost irrevocably. Restoration of vision in the squinting eye is possible only if the child is seen very soon after the beginning of the squint, and the younger the child is the more rapid is the loss. A routine examination of all children is not needed if the parents and physician are alert. More depends on the observation of the nurse and mother as the early evidences of strabismus are apt to be fleeting and it is at this period of incipency that treatment is simplest and briefest. A child who has squinted, however, should not be

dismissed without a thorough examination under atropin. Glasses correcting far-sight and astigmatism should be worn constantly even by very young children, and if the error of refraction is considerable they are accepted willingly. Atropin,  $\frac{1}{4}$  per cent. solution, should be used once a day in the fixing eye to depress its function and this may be continued for weeks. Occlusion of one eye may also be necessary for a prolonged period. If after a thorough and discriminating use of these methods, there is no apparent diminution in the squint, or if the case is a neglected one, an operation may be conscientiously advised. If, however, there is any progress, if the unilateral squint becomes alternating, or if there are remissions when the child's eyes are at rest, and especially if the condition permits fusion training with the amblyscope it seems to me wise and conservative to defer operation.

The hygiene of the squinting child is of first importance. It is often noticed that children squint only when excited or tired. The indications in such children are out-of-door life, the withholding of small toys and tasks, and the postponement of lessons where possible, and in any case done at arm's length as on a blackboard. The home life and the attitude of nurse and parents may need revision.

DR. WOOTON read a paper on

#### THE OPERATIVE TREATMENT OF STRABISMUS.

Since paralytic strabismus is exceedingly rare in children, for the obvious reason the acquired syphilis, its most common cause, is hardly ever present, the operative treatment of strabismus in children resolves itself for all practical purposes into the treatment of the concomitant or nonparalytic variety. This variety of strabismus presents itself under two forms, convergent and divergent, of which the former is by far the most common. The almost invariable operative procedure employed for the relief of these conditions in the past was tenotomy of the muscle or muscles believed to be in a state of spasm. This operation has been to a large extent replaced by, or combined with, operations designed to strengthen the action of the muscles believed to be weakened by disuse.

In the surgical treatment of the convergent variety we have the choice of one of three operative procedures, tenotomy of one or both interni, advancement of both externi, or the shortening or advancement of the externus of the deviating eye combined with tenotomy of its internus. In uncomplicated cases my experience has been almost entirely confined to the first and second methods, and in choosing one or the other I think we should be guided by certain circumstances of the individual case. I think it is true that an advancement of both externi to the corneal margin, insofar as the permanency of the results and the possibility of restoring binocular vision are concerned, is the operation of preference, but a rather extensive experience with its use has convinced me that it may at times be advantageously abandoned in favor of tenotomies. When the squinting eye possesses very little vision, is in a high degree

amblyopic, no operative procedure can be relied upon to produce a permanent cure and it seems rather useless to subject the patient to the inconveniences of advancements, or the surgeon to the difficulties of their performance. In such cases a tenotomy of one or both interni just sufficient to undercorrect the deviation slightly, is, all things considered, the better procedure. The great disadvantages of this method is that gradual divergence will subsequently ensue, but in the cases mentioned ultimate divergence will probably follow any method and if we undercorrect the deviation slightly, it is possible to maintain a good cosmetic result for years by the proper employment of glasses.

Again when the eyes are deeply set, advancements are difficult to perform, and their cosmetic effect is far from pleasing. After a tenotomy an eye protrudes slightly; after an advancement it recedes slightly, and in the cases mentioned the ultimate result of advancement of both externi is that an expression of cunning is produced. Another disadvantage of advancements is that they leave behind them for a considerable period of time a yellowish discoloration at the site of the operation.

Tenotomies should be employed when the vision of the squinting eye is fairly good, when the eyes are fairly prominent, and when the parents do not object to the patient's confinement in a hospital for a week. Under such circumstances an advancement of both externi will procure better and more lasting results than any other method. In performing tenotomies one must be guided by the amount of effect desired and should leave a slight degree of squint uncorrected. In all cases the externi should be advanced to the corneal margin, whether the squint be one of 10, 20, or 30 degrees.

On the other hand the technic of tenotomy is simple, while that of a thorough advancement is complicated. The former can generally be performed under cocaine, while the latter necessitates a general anesthetic. The after-treatment of tenotomies amounts to nothing, while a double advancement requires attention for a week. Nevertheless, advancement of both externi unaccompanied by tenotomies is greatly to be preferred in suitable cases. The surgical treatment of divergent strabismus is more complicated than that of the convergent variety and should depend entirely upon the character of the muscular anomaly that is causative. This thesis has not been sufficiently promulgated. Another point that should be emphasized is that while glasses should always be prescribed in convergent cases, and by their employment cures without resort to operative measures may frequently be accomplished, they are of no curative value whatever in a very large class of those of the divergent type.

When the squint is associated with myopia and insufficiency of converging power, advancement of both interni is the proper procedure, and is invariably followed by good results. When the deviation is associated with hypermetropia and an excess of diverging power, a free tenotomy of the externi, repeated if necessary, will be equally successful. In the first class of cases, tenotomies of the

externi and in the second, advancement of the interni will always result in failure.

It would seem from these statements that the operative treatment of diverging strabismus ought always to be successful, and so, in my opinion it is, in the two classes described which constitute the greater number of our cases. Unfortunately there remains a group in which refractive and muscular errors are neither so clearly defined nor so distinctly associated. Thus, for instance, we find cases in which one eye is hypermetropic and the other myopic and others in which the muscular anomaly is a combination of an insufficiency of converging power and an excess of diverging power. In these cases the result of operative measures cannot be so accurately prognosticated. When one eye is myopic and the other hypermetropic, the prescription of glasses is usually of no value, and in operating I think we should usually attack the muscular error, which is more prominent. If we are finally compelled to add a tenotomy to our advancements, or an advancement to our tenotomies, we must expect that we shall sometimes produce an overeffect. A slight overcorrection of divergent strabismus is not, however, as disastrous as an overcorrection of convergent strabismus, for while a slightly convergent strabismus is hardly discernible, a slight divergent squint is a noticeable deformity.

#### DISCUSSION.

DR. WALTER B. WEIDLER.—I want first to emphasize the importance of getting glasses on these children early. If we can get medical men to realize the importance of correcting errors of refraction by proper glasses, I believe many cases of amblyopia may be prevented, for I believe that in many cases the amblyopia comes on after the squint has developed, and when it has once begun it grows apace with the squint. If we can give relief normal vision may be restored and amblyopia prevented, and we may develop the fusion sense so that we can procure equal convergence of both eyes.

In the treatment of unilateral constant squint the results to be worked for are: 1. The prevention of further loss of vision and the restoration, if possible, of normal vision. 2. The removal of the cause of squint if possible. 3. To bring both eyes to a parallel converging axis. These results may be obtained by (1) correcting the refraction; (2) by the instillation of atropine in the fixing eye; (3) by occlusion of the fixing eye; and (4) by training the fusion sense.

In correcting the refraction a mydriatic should be used and the eyes tested three or four times. Hypermetropia and astigmatism are present in 95 per cent. of the cases of convergent squint, though a small percentage may be myopic. Myopia and astigmatism are associated with divergent strabismus. In hypermetropes one should prescribe correction or a little less ( $+0.50$  sp.). For myopes one should prescribe full correction. Glasses must be worn constantly. Many parents object to this because they fear that the glasses will be broken and the eyes injured, but I have still to see an

eye that has been injured by broken glasses. Personally I give glasses very early, having given them as early as the eleventh month. The children soon learn to wear them just as they would any other article of clothing.

The use of atropine in the fixing eye may be continued for weeks or months and is useful as it makes the squinting eye do all the work and as a result of this measure we often find a very decided improvement in the vision of the squinting eye. The child is compelled to use the defective eye or all near point seeing and reading, and amblyopia is thus prevented. Improvement may be noted in these cases after weeks, months, or even years of treatment. The oculist should see these children at first twice a month and then once a month.

For occlusion of the fixing eye a bandage is usually employed. This measure is suitable for cases in which the vision is very poor and there is a high degree of amblyopia and where the child's eyes have been neglected for years. Continuous occlusion is sometimes difficult and troublesome to apply as the pad must be changed every day. Vision should be tested at the end of a month and if improved one can change to atropine instillation. If vision does not improve in three months, recovery of vision is doubtful.

Worth's amblyoscope may be used in an attempt to develop the fusion sense but is rather difficult. It can be to get continued coöperation on the part of the parents and the child. It is best used between the ages of three and five.

In alternating convergent squint there is usually no amblyopia. In these cases glasses alone will accomplish all that is necessary.

DR. ALEXANDER DUANE.—There are two very important points that should be kept in mind in the consideration of squint in children. The first of these is that there are three varieties of squint differing radically in nature and in treatment. The first, comprising the large majority of cases, is acquired squint. Nearly all cases of acquired squint in children come under the head of the concomitant convergent strabismus of which Dr. Cutler has spoken and which he has described so well that he has left us little to add. This form of squint develops usually at from two to five years of age, and represents an excessive convergence due to hypermetropia. It passes through various stages, the development of which we can observe. It is treated first by means of glasses which should be worn constantly from the earliest age; second, by training with the amblyoscope and stereoscope; third, by educational exercises of the squinting eye, reinforced by atropinization and bandaging of the good eye. It is marvelous what results can be obtained both in straightening the eyes and sometimes also in improving the sight of the squinting eye if we get the child early enough and treat it diligently. Only when we can be sure that no more could be done for the child by these means should we consider the question of operation, and then we should operate according to the indications of the case as Dr. Wootton has said.

The second class of cases, comparatively small, but yet important, comprises the congenital cases. There are several distinct types of



these, often so clearly marked that they can be recognized in babies five or six months old, in whom one can take out even the muscles affected. These cases are usually peripheral—due to actual changes in the muscles themselves, very rarely to central nervous changes. We can readily prove that these anomalies often cause the child trouble due to the confusion produced by the double vision. In order to overcome this he sometimes adopts the simple expedient of shutting one eye so as to exclude one of the two images, or as this soon proves troublesome he tips his head so as to make it easier to overcome the diplopia. The attitudes assumed are characteristic and can be made out at a very early age. A third way in which the child helps himself is to separate the double images so widely that they no longer cause confusion. This he does by diverging or converging the eyes, thus giving rise to the third or mixed variety of strabismus. The congenital type of squint can be relieved only by operation.

The third class or mixed cases comprise those which begin with a congenital squint, usually a vertical one, and afterward develop an acquired squint in addition. In many of these cases this secondary acquired squint represents an involuntary divergence or convergence of the eyes, set up in the manner already indicated in order to avoid confusing double images. These cases are fairly common and a failure to recognize their composite character is a cause of the failure to cure them. If we wish to succeed we must first relieve the vertical squint by operation. This alone may relieve the lateral deviation too; if not the latter can be treated according to the rules laid down for ordinary concomitant squint.

The second point, and it is of very great importance is that the diagnosis and treatment of these cases should be undertaken just as early as possible. Too often the contrary practice obtains. It is taught that no harm is done by leaving a squint untreated until the age of nine or ten when, if necessary, the child can be operated upon. Others lay stress on the fact that the squint sometimes cures itself. This is true, but this spontaneous cure occurs in a small minority of the cases, and even so the result is not as satisfactory with regard to vision as if the child had been treated properly from the first. And in all other cases if we let the time go by without treatment we fail in our duty in two regards. First, we fail to relieve the symptoms from which the child evidently suffers—symptoms which are obviously relieved by the glasses which the child accepts gladly. Second, we miss the chance of restoring binocular vision and of increasing the sight in the squinting eye. We have missed, that is, the chance to apply a method of treatment which both as regards vision and cosmetic result gives better results than operation.

Likewise in the congenital and mixed cases it is important to begin treatment early. Such cases may develop various disabilities, for example, a false wry neck, which can be relieved by operation on the eyes. I show pictures of a child which demonstrates the immediate effect produced on the position of the head by an operation of this sort. So, too, in the mixed cases the earlier the congenital element is

relieved the more satisfactory will be our results, and as already stated unless this element is relieved the results will be disappointing.

DR. GODFREY R. PISEK.—I think we should congratulate our officers on their good judgment in bringing before us specialists to review the subject of strabismus. The general practitioner and the pediatrician both profit by the presentation of a topic of this kind. In considering strabismus the pediatrician is not restricted to concomitant strabismus as is the ophthalmologist, but takes it up in a more general sense. He considers strabismus more directly from the standpoint of diagnosis. It is one of the functions of the pediatrician to make the diagnosis of gross ocular conditions and then if necessary send the patient to the ophthalmologist for a closer examination and treatment. If his patients come at regular intervals for prophylactic examination it is incumbent upon him not to forego making some examination of the vision. If there is no history of general disease, one may be led to suspect a possible diplopia from the way in which a child carries his head or handles his toys, and the position of the head in relation to objects in his hands. If we find that a child has strabismus we should send him to the ophthalmologist and send him early. In the city we have specialists to whom we can send such children for early correction, but in the country this is often a neglected field, and it is only later when the child goes to school and is subjected to the routine medical inspection that attention is called to his defect or any effort is made to correct it. It may only be when symptoms as vertigo, headache, and symptoms of eye strain appear that a physician is consulted and then he is apt to use the Snellen test card which is no sufficient to determine the second and third, or mixed types of strabismus as mentioned by Dr. Duane. However, the pediatrician has to consider the strabismus that follows acute infectious diseases, the strabismus which helps him to localize brain lesions, or the strabismus that may occur as an early sign of tuberculous meningitis. The pediatrician, therefore, often centers his attention on the eye to a large extent and he is fortunate if he can bring all the relationships of the eye to help him in his practical diagnostic work.

Personally I feel extremely grateful for the excellent papers presented to-night.

DR. ISAAC W. HELLER.—There are one or two points that I would like to speak about. These cases of strabismus which are complications of brain lesions are ruled out of our discussion because in them there is always some other symptom very much more important than the strabismus.

It is a good rule to remember that no normal eye squints. I say this because it happens that children come to me with strabismus and the mothers say they were all right until something happened, as for instance until the child had measles or whooping-cough. The physician has told her that the strabismus is not of much significance and that she should wait a month or two before consulting an ophthalmologist. She waits not a month or two but a year or two before consulting an ophthalmologist and the child continues to squint.

She says her doctor made very little of it. Now if the child is a girl the cosmetic effect is very important as is readily understood, and if the child is a boy the strabismus will be a handicap in business. A child with this defect is teased by his playmates, becomes shy and altogether the defect is a great handicap. So when the physician sees a strabismus he should send the child to an ophthalmologist. There is an impression that a child with strabismus should not be operated upon until he is five or six years old and that if he is sent to the ophthalmologist an operation will be advised. As a matter of fact the ophthalmologist does not advocate an operation until the child has worn glasses for six months or a year. If at the end of that time he is improving there is no necessity for an operation and none is performed.

Another point of importance is that the mother of a child often says the child is not cross-eyed but only has a cast; people do not like the term cross-eye and so call the defect a cast. It is important to emphasize the fact that a cast is strabismus.

Dr. Midler has said that we cannot put glasses on a child with strabismus too young and has cited an instance in which he prescribed glasses for a child of eleven months. I have a child under observation who has worn glasses since the age of nine months. One can accustom such a young child to glasses by getting a cheap frame and having the child wear it for a week or two without any glass in the frame. Then when the child becomes accustomed to wearing the frame good glasses can be put on. Children who have become accustomed to wearing the glasses and to the relief that they give cry for them when they are taken away.

DR. LOUIS C. AGER.—In reference to the etiology of strabismus, it surprised me to hear Dr. Wootton say that paralytic strabismus is a negligible thing in children. Certainly during the last summer we saw a very large number of cases of paralytic strabismus due to infantile paralysis. I know of eight cases that occurred in the course of typical acute infection; they had the paralysis in the acute stage. During the acute stage of infantile paralysis I saw literally hundreds of cases of paralytic strabismus, though most of them were not residual.

DR. ARTHUR S. TENNER.—I wish to emphasize what Dr. Heller has said about getting these cases early. If we saw these cases early and treated them properly there would not be so many cases of amblyopia that are incurable.

I wish to take exception to a statement made about limiting oneself to a tenotomy of the internal rectus, in cases of convergent strabismus, where nothing but the cosmetic effect was desired. It seems to me that would be a reversion to our former practice and not in line with modern method. Such a tenotomy, thorough enough to straighten the eyes may, as we know, produce a later divergence, and it is for this reason that I do a shortening of the externus with, if necessary, a partial tenotomy of the internus. Only one eye is subjected to operation and there is not much more reaction than with a simple tenotomy, with none of the disadvantages of the latter.

DR. WOOTTON, in closing the discussion.—In regard to the objection that was taken to my statement as to the treatment of paralytic strabismus, it must be remembered that my subject was the operative treatment and I do not think that the cases of strabismus resulting from poliomyelitis comes to operation. It is a fact that paralytic cases are relatively infrequent and I, therefore, omitted a consideration of their treatment.

In regard to what Dr. Tenner said, Dr. Wootton did not think there was any difference between shortening an externus combined with tenotomy of its internus and doing a tenotomy on the interni. One may advance both externi or shorten one externus and then reinforce it by a tenotomy of the internus and while one may think that there would be little difference in the results obtained by these two procedures, one gets better results and more permanent ones by the advancement of the interni.

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## BRIEF OF CURRENT LITERATURE

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### DISEASE OF CHILDREN.

**Scarlet Fever, Morbidity and Fatality.**—A statistical study by H. H. Donnally (*Amer. Jour. Dis. Child.*, 1916, xii, 205) of figures obtained from several million board of health notifications of cases and deaths from scarlet fever supports the following conclusions. Periodicity in the appearance of epidemics of scarlet fever cannot be made out. Morbidity and mortality rates for scarlet fever seem independent of each other. A decline in morbidity has not generally been made out. Where notification has been of longest duration and most thorough (Norway) a reduction in the incidence of scarlet fever has been observed. Season itself does not influence morbidity. The sexes as a whole show equal susceptibility. Under five years of age boys are more susceptible, while between five and fifteen years of age girls are more susceptible than boys. About half of the cases occur in children between three and eight years, and 90 per cent. in those under fifteen years of age. About two children out of three between three and eight years of age contract scarlet fever if exposed to it in their homes, if they have not previously had it. Scarlet fever appears to be a milder disease than formerly. Different epidemics may vary greatly in virulence. Scarlet fever has been regularly more prevalent in some places than in others. It has been consistently attended by greater fatality in some places than in others. At all ages males succumb more readily to it than females. Case fatality is lowest in those about ten to fifteen years of age. The younger the child, the less is his chance of recovery. About 90 per cent. of deaths from scarlet fever occur in those under ten years of age.

**Acetone Bodies in the Blood of Children.**—The blood of sixteen normal children was examined quantitatively by F. Moore (*Amer. Jour. Dis. Child.*, 1916, xii, 244) for acetone bodies (beta-oxybutyric

acid, aceto-acetic acid and acetone). Expressed as milligrams of acetone per 100 grams of blood, this was found to vary from 1 to 13 milligrams, with an average of 6.3 milligrams. The blood of a normal child after forty-eight hours of voluntary starvation was examined for acetone bodies and found to contain 39.5 milligrams acetone bodies per 100 grams of blood. Acute febrile disturbances are accompanied by an increase in the blood acetone, though this may not be very marked. In some patients showing acidosis clinically, the acetone content of the blood was found to be sufficient to account for the acidosis. Many cases of acidosis in infancy and childhood are not accompanied by an increase of acetone bodies in the blood sufficient to account for the severity of the acidosis. In a given case of acidosis acetonuria alone does not indicate that the acidosis is due to an increase of the acetone bodies in the blood. To determine this quantitative studies of the blood are necessary.

**Types of Pneumococcus Found in the Pneumonias of Infants and Young Children.**—In a series of fifty cases of pneumonia in young children studied by M. Wollstein and A. W. Benson (*Amer. Jour. Dis. Child.*, 1916, xii, 254) the comparative frequency (60 per cent.) of type 4 pneumococcus was noticeable, as was also the high mortality (40 per cent.) rate it caused. Pneumococci of types 1 and 2 were present in a higher percentage of lobar pneumonias than of bronchopneumonias; the mortality rate of the cases in which type 1 was found reached 83 per cent., and type 2 was fatal in 33 per cent. of the cases in which it occurred. All these figures are much higher than in lobar pneumonia cases in adults, and the greater mortality of type 1 over type 2 is also to be noted.

**Epidemiology of Pertussis.**—P. Luttinger (*Amer. Jour. Dis. Child.*, 1916, xii, 290) says that epidemiologic studies in whooping-cough conducted by the Research Laboratory shows that pertussis is a very prevalent disease in New York City, and that probably only a tenth of all cases are reported to the Department of Health. About 80 per cent. of all cases and 97 per cent. of all deaths are in children under five years of age. Fifty per cent. of the cases are in those under two years of age, and over 50 per cent. of all deaths are in children under one year of age. The incidence of pertussis among girls, as well as the number of deaths, is constantly higher than among boys, the proportion of both morbidity and mortality being about 44 per cent. for boys and 56 per cent. for girls. In contradistinction to other respiratory diseases, whooping-cough seems to be most prevalent in the spring and summer months and the mortality curve reaches its highest point in August, showing a similarity to the diarrheal diseases, although most deaths are due to pertussis pneumonia. Poor surroundings, congestion, lack of fresh air and proper care due to the guardian's precarious economic status seem to have a determining effect on both the morbidity and mortality of pertussis. The actual case mortality in whooping-cough is difficult to estimate, owing to incomplete returns; it is probably about 1 per cent. The death rate per 100,000 population is about 7. It has been steadily decreasing for the last fifty years having been as

high as 58.82 in 1872 and as low as 4.71 in 1908. Whooping-cough is transmitted by direct contact and in nearly 60 per cent of cases the source of infection is given as coming from a neighbor. Relatives and friends, schools, nurseries, recreation piers and ferries are other sources of infection. Moving-picture shows and public conveyances seem to be important factors in the dissemination of the disease. Adult pertussis carriers probably have been disseminating the disease and have remained unrecognized owing to the atypical form in which it manifests itself. Pertussis vaccines, as prepared by the Bureau of Laboratories, when given early, have continued to give good curative and prophylactic results at the Whooping-cough Clinic and in the hands of a large number of private practitioners and health officers. The very small number of deaths under vaccine treatment and the vast crowds who apply for treatment at the clinic indicate a favorable and possibly tangible influence of the specific treatment on the further epidemiology of the disease

**Anaphylactic Skin Reaction to Diphtheria Bacilli.**—J. A. Kolmer and E. L. Moshage (*Amer. Jour. Dis. Child.*, 1916, xii, 316) say that following the injection of diphtheria toxin in the conduct of the Schick test for antitoxic immunity in diphtheria, inflammatory reactions may be produced (1) by trauma and undue sensitiveness of the skin; the influence of these reactions may be minimized by injecting a minimum quantity of fluid (not over 0.1 c.c.); by using a stock toxin of high potency in order to require high dilution and the consequent injection of a minimum amount of the constituents of the broth, and by the employment of a proper technic (especially a small needle); (2) by an anaphylactic reaction to the protein of the diphtheria bacillus and to a lesser extent to the protein constituents of the broth itself, the former being more important; (3) by the irritating effects of the toxin itself, constituting the true toxin reaction of Schick. An anaphylactic skin reaction to the protein of the diphtheria bacillus was observed in about 70 per cent. of children and 35 per cent. of adults following the intracutaneous injection of a polyvalent antigen of washed, neutralized and heat-killed diphtheria bacilli (diphtherin). These reactions were regarded as anaphylactic in character and therefore entirely distinct from the true toxin reaction of Schick. The percentage of positive diphtherin reactions was higher than the anaphylactic reactions observed with the toxin of the Schick test due to a higher amount of protein being injected. About 53 per cent. of persons of various ages yielded positive diphtherin and negative toxin (Schick) reactions. About 10 per cent. yielded negative diphtherin and positive toxin reactions, both tests agreeing therefore in about 63 per cent. of persons; 12.5 per cent. reacted positively and 24.1 per cent. negatively to both tests. The percentage of positive diphtherin reactions was slightly greater among those who were convalescent from diphtheria. There is no relation between the occurrence of positive and negative diphtherin and toxin reactions and the presence or absence of diphtheria bacilli in the upper air passages. A negative toxin reaction (Schick) in a

person presenting clinical evidences of infection indicates that the individual does not require antitoxin, but nothing more; he may be infected with virulent diphtheria bacilli capable of disseminating the disease. While the diphtherin test indicates hypersensitiveness to the protein of the diphtheria bacillus, it has probably no value as an index of immunity and is of practical interest mainly from the viewpoint that the anaphylactic reaction may be mistaken for a positive Schick reaction.

**Tendency of the Diphtheria Bacillus to Localize in the Upper Respiratory Tract.**—Because of past experiences in finding that the organisms of diphtheria may be present in the larynx and absent in cultures taken from the nose and throat, or positive in the nose and absent in the throat, and so on, D. O. Walthall (*Amer. Jour. Dis. Child.*, 1916, xii, 149) made a number of observations with this point in view. Of eight cases, the organisms confined themselves to one locality in five cases, to more than one locality in three cases.

**Normal and Pathologic Cerebrospinal Fluids in Children.**—M. R. Johnston (*Amer. Jour. Dis. Child.*, 1916, xii, 112) investigation was undertaken to determine the relative value of various methods in use in the examination of the cerebrospinal fluid in sundry affections of the central nervous system of children. One hundred and nineteen fluids were examined from 100 patients. His findings are that as an index of pathologic change in the cerebrospinal fluid, the colloidal gold reaction is more delicate than any other test here employed. A positive Lange reaction may be considered sufficient evidence of a pathologic process affecting the cerebrospinal nervous system, though the fluid in question is negative to all other tests. A normal fluid causes no reduction of the colloidal gold. The presence of globulin in the cerebrospinal fluid, as determined by the tests of Noguchi and Nonne, is indicative of an inflammatory process, but is of no specific import. A negative globulin test may occur in a pathologic fluid. The quantitative estimation of organic substances by the reduction of tenth-normal potassium permanganate shows such wide variations in normal fluids and those with slight pathologic change that it has no value as a diagnostic measure. The qualitative presence of dextrose in the cerebrospinal fluid as determined by the reduction of Fehling's solution is of little value in the diagnosis of lesions of the central nervous system. The specific diagnostic import of a given test is dependent on the character of the process causing the change in the fluid examined. Thus the cell content and bacteriologic findings are final in purulent and tuberculous meningitis. In the colloidal gold test the characteristic syphilitic zone reaction in hereditary syphilis is sufficient to establish the actual or potential existence of a syphilitic involvement of the central nervous system. This statement presumes a positive Wassermann reaction on the blood. A number of affections give this same reaction, particularly acute anterior poliomyelitis, and no specific significance can be attached in nonsyphilitic cases. The occurrence of a typical zone reaction in the colloidal gold test on fluids from patients with tuberculous meningitis is probable, and

may be of value in diagnosis in the early stages. The occurrence of a transitory reaction in the lower dilutions suggests an aid in the diagnosis of acute anterior poliomyelitis.

**Prevention of Infantile Paralysis.**—Although we are still in great ignorance as to the mode of transmission of infantile paralysis, it is pretty well agreed that the most common avenue of infection is through the mucous membrane of the nose. Hence it seems to W. S. Whittemore (*Bost. Med. and Surg. Jour.*, 1916, clxxv, 231) logical in combating the disease to use a substance which has been shown to be capable of practically sterilizing the nose and throat and is, moreover, free from any irritating effect. From experience with kaolin powder in the treatment of infections of the nose and throat during the past year, he suggests its use as a possible method of preventing infection of children and adults with infantile paralysis. It should be insufflated into the nose and throat every two hours during the day.

**Quarantine Period for Measles.**—W. B. Whyte (*Can. Practitioner*, 1916, xli, 336) says that all are agreed that the most infective period of measles is the invasion and early eruptive period. As most cases are well into the eruptive stage before seen by the medical profession, any measures decided upon to cope with the situation should be directed toward the control of the movements of contacts rather than to prolonged isolation of the original infecting case. Quarantine and observation of contacts for fourteen days from the date of the last exposure to the original case would seem to be the only effective measure in preventing the spread of infection from house to house. If it were possible to provide a routine examination of patients for Koplik spots during the second week of quarantine many cases could be put under strict isolation during the very period when such a measure is of some value. Prolonged quarantine of the original infecting case probably has no bearing upon the prevention of the spread of infection, but the danger of subsequent cases developing within fourteen days, is the more important detail in any effort to control the disease.

**Undescended Testis.**—D. N. Eisendrath (*Annals Surg.*, 1916, lxiv, 324) urges that cases of true nondescent or ectopic descent of the testis should be operated upon at as early an age as the condition of the child will permit, the lower limit being about two years. Atrophy of the spermatogenic cells occurs in about 90 per cent. of the cases of retained testis, hence the necessity for early operation. Tumor formation, torsion and the usual complications of the congenital hernia accompanying nondescent of the testis are not as rare as thought to be and must be taken into consideration in weighing the question of an operation. Hypopituitarism is not the result of the nondescent, but an independent and not infrequent accompanying condition. The operation for nondescent, *i.e.*, retained testis, has but little influence upon this lack of development of the male sexual characteristics and one should be guarded in the prognosis for such cases, as well as in the possible development of the testis after operations in young adults.



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EDITORS

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GEORGE W. KOSMAK, M.D.



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# For Mother and Child

After prolonged lactation a mother's milk usually decreases in quantity and nourishment. It is then that a properly prepared liquid extract of malt and hops would not only increase the volume of breast milk but the amount of its fat content. But to accomplish this, it must be a **REAL** extract of malt and hops and not a cheap imitation.



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operations in surgery. Radical removal of the uterus means to lay bare some inches of the ureter and to dissect to the obturator foramen in getting most of the paravaginal and paracervical fat and to own an equipment that will illuminate adequately this deep cavern. The so-called Wertheim's seen by me in England and the Wertheim's usually seen in America before the American Gynecological Club's German trip of 1912, were almost without exception ordinary total hysterectomies, bringing scant paracervical or para-



FIG. 1.

vaginal structure and not cleaning off the lateral pelvic walls clear down to the pelvic floor. A radical operation takes nearer two hours than one and a half hours. In the best hands the mortality is necessarily very high and a not inconsiderable number of ureters are injured. Wertheim told us that cancer of the cervix in fat women should not be attacked by the upper route but by the lower. Those cancer cases which come early and give the better results with the Wertheim operation, an enlarged Byrne operation will usually suffice to cure. When the glands are involved, we all know how seldom cure is recorded.

The gynecologist who is in the habit of doing a reasonable proportion of his hysterectomies by the vaginal route is able to institute comparisons upon a basis of experience. Exclusive of hospital patients, my private records show seventy-eight vaginal removals of the uterus. Comparing the partial hysterectomy of Byrne with the Schauta vaginal hysterectomy, as seen in four cases at his clinic and in three done since seeing those cases, I can say that the cautery knife can make neither so wide nor so intelligent a dissection as the steel knife and scissors of Schauta and his assistants. The heated platinum blackens and shrivels and obscures structure. This is a handicap. It takes great skill to dissect out the ureter in a genuine Austrian "Erweiterte Operation." The lovely pictures in the book are more dressed and trimmed up by the artist than my series of careful sketches taken over the Viennese shoulders, which show the frequent difficulty in identifying and clearing the ureter.

I have seen Werder do his operation in Pittsburg, but inasmuch as the cervical parametrium presents the danger zone of extension in cervix cancer, it seems to me that, as long as a vaginal attack has been undertaken, the whole work had better be completed through the vagina. The only excuse for any of this clumsy, slow cautery technic is the sealing of the lymphatics. The lymphatic channels which carry dangerous cells are those of the lower portion of the broad ligaments, and these are sealed by Werder in his vaginal cautery work. The cautery clamp on the ovarian and round ligament vessels of the upper third of the broad ligament is, therefore, an unnecessary precaution against cancer located in the cervix, and a considerable difficulty and complication. His clamp follows the method of Downes. Downes' clamp is a modification of the Skene clamp, adding to the power and ecraseur action of the original instrument. Therefore, the operation advocated by Werder is a combination of two Brooklyn hysterectomies—that with electrohemostatic clamps—namely Skene's, on top of a Byrne cervix amputation.

I have seen Percy (and others) cook the core of the womb with an assistant's hand inside the abdomen grasping the uterus and have not failed to note somewhat brutal tools, shock, a huge, shut-in slough, and a considerable death-rate. We know now how this radiation in the pelvis, heating until all the red cells in the body have time to pass, may disintegrate them, and that autopsy has shown gastric ulcers corresponding with the findings after extensive superficial skin burns.

Technic is purposely presented to you this evening rather than



results. Not that careful reports lack weight in argument, but that each operator of sorts must judge for himself. Every man of wide experience and trained judgment who controls ample material must

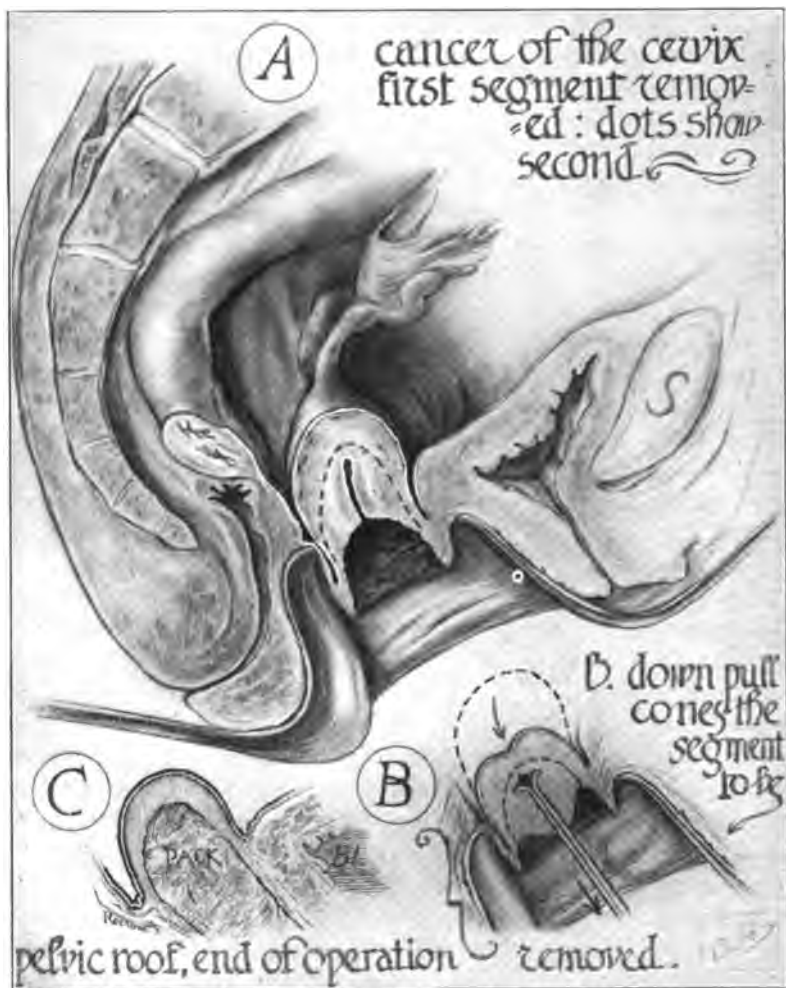


FIG. 2.

reach his own conclusions in any operative procedure. Demonstrate your technic to me; show me the kind of case to which you believe your operation better adapted than any other; let me see you go through the steps, and, if it seems reasonable, I will give it a conscientious test. This is particularly the case in such instances

as cancer of the cervix where few operable tumors come to any one individual, and where many surgeons must try out a claim. It is especially true when, disappointed with a newer radical method, we are asked to turn back to an older plan that presents new features.

By an *enlarged Byrne operation* I mean: *a.* Take the core out of the uterus, removing all of the canal of the body of the uterus as well as the cervix, so that the circular scar of the burn, in its inevitable contraction to a stricture, does not yield the characteristically severe dysmenorrhea that results when only the cervix and part of the canal of the uterus is removed. Byrne often employed this technic, saving only the fundus of the uterus. The advantage of leaving the fundus is that one secures a roof for the pelvis (Fig. 2, *c*). It practically peritonealizes this operation. It prevents bowel adhesions. We who have often done a Byrne cautery operation for the lower part of the broad ligament and then treated the remainder of the uterus like an ordinary vaginal hysterectomy, need of course, to sew the broad ligaments together as a final step. But this additional removal is unnecessary, because in cancer of the cervix the recurrence is not in the upper part of the broad ligament but in the lower part, and it is not good surgery because cutting and sewing should not be done in the neighborhood of cancer tissue.

*b.* Take all the paravaginal and paracervical tissues that can be safely removed. Our vaginal hysterectomies that have taken in a large part of the broad ligament by the method of Schauta (preceded by the sweeping pelvic incision of Schuchard) taught us how to secure the needed free access. This knowledge and experience of the distance we can safely go have been important enlargements of the Byrne method, which, as far as I know, he never used. Big or water-cooled specula seem to me clumsy and unnecessary. Even Byrne's wet gauze guards placed under the retractors narrow the passage. Two retractors, acting just where one is working, usually suffice.

*c.* To use the gloved finger in the rectum and the thermometer or little finger in the bladder is to have a guide to deeper and further work than we were able to do in Byrne's time. This development and enlargement of Byrne's method Percy has contributed. It has been shown that the long heating of Percy may cause disintegration of all the red corpuscles. Percy's iron cooks a considerable area steadily. To the red knife edge this grave objection does not apply. Byrne's knife touches only one point at a time.

*d.* In certain cases one opens the abdomen and has the assistant hold the uterus in the gloved hand so that he can report when the



FIG. 3.



FIG. 4.



knife is in danger of going through the peritoneum. This guidance by the method of Percy is an important contribution. It enables us to work more briskly, but of course it adds very materially to the mortality, because of the peritoneal shock involved from a hand in the peritoneal cavity during the hour and a half necessitated in doing certain cases.

These then are the enlargements of the Byrne operation which, while not novel, might be said to give a fuller scope and a promise of better results. Dr. Byrne has removed the entire uterus with no more than the ligation of the ovarian arteries. I had to show that it could be done (not because I desire to advocate it) and re-



FIG. 5.—Two-piece removal with whole endometrium early involvement.

moved the whole uterus with the use of one single ligature. It shows how these large vessels can be shrunk securely. The upper vessels are not as fairly treated by cautery as the lower because the uterine artery is accessible and retreats so little that it can be hardened to the consistency of horn and trusted not to bleed.

We have tried doing a Byrne amputation of the cervix, and, some weeks later, an abdominal hysterectomy, but I must condemn it. One is obliged to wait till granulation is complete. By this time there is a strongly contracted scar-ring which prevents uplifting the fundus and the top of the broad ligament and masks the ureter relations in such an attack from above.

The apparatus\* comprises two electrical devices. One is known as a rotary converter. This is used to transform the direct current into an alternating current. An alternating current may be transformed far more easily than a direct current. Therefore, the alternating current is used. This alternating current from the rotary is in turn put through a closed circuit transformer. This closed circuit transformer steps down the voltage from that obtained from the rotary (about 75 volts) to about 20 volts. This 20 volt alternating current is obtained from the secondary of the transformer, and may be regulated from 0 to 20 volts. At the same time, in converting this higher voltage alternating current into a lower

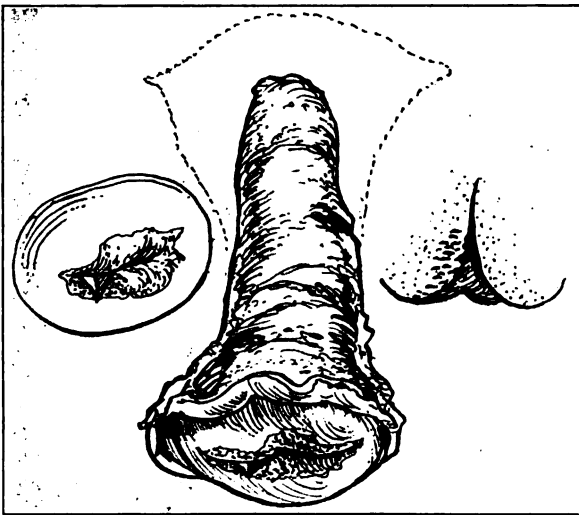


FIG. 6.—One-piece removal taking all endometrium.

voltage alternating current, we are also transforming the quantity of electricity from a lower amperage to a correspondingly higher amperage output, so that one is able to obtain a lower voltage and higher amperage. This, then, is used for heating the cautery knives.

Between the transformer and the knife run particularly heavy cables, in order to lower resistance and to prevent heating. This applies especially to the wires running through the handle to the knife. This handle is very heavily insulated and does not heat up in a long operation. The absence of a switch in the handle seems to me also to make for lowered resistance and cooler structures, but some operators prefer such a switch.

\*The outfit is made by the Wappler Electric Manufacturing Company of New York.

The peculiarity of my knife, in which it differs from others, lies simply in its larger mass of metal. Thereby the lower degree of heat is longer held, and thereby also in connective tissue planes the slightly curved blunt blade can push away structures like the bladder.

The difference from previous apparatus, and practically the whole story of efficiency in this outfit, now about eight years in use, depends on two things; a powerful rotary converter and a powerful knife connected by heavy wire. Little knives and thin knives cool

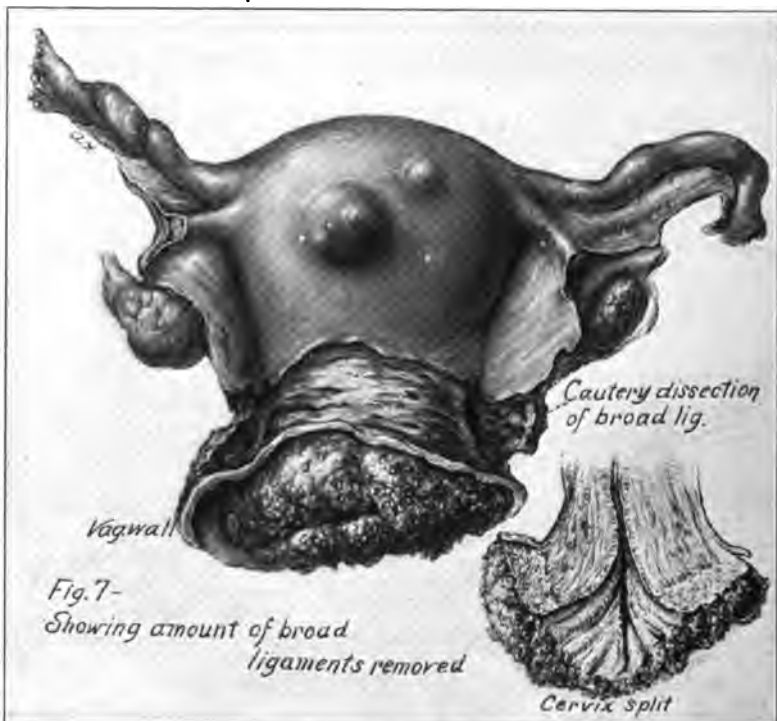


FIG. 7.

quickly, and, in consequence, the operator heats them far too hot, so that the tissues are charred instead of being cooked to horn. A black scab on the end of a vessel is knocked off by the blood current or the retractor. The tough, white, stiff surface, feeling and looking like horn or rubber, is the tissue to leave in the track of the knife. Thus he who has used the method a few times is not afraid to cook the uterine and trust to the cooking to hold the vessel, but the beginner will sleep better with ligatures about these big vessels.

*Steps of the Operation.*—Rotten tissue may be curetted from the

cervix cavity, the surface seared well with the flat of the knife. Dragging downward on the uterus and making counter-traction so that the line of incision is taut, the knife edge whitens a millimeter each side of the cut. Charring is to be avoided as far as feasible and also extreme white heat of the platinum. The perpetual refrain of this operation must be that of Byrne—"less heat," "less heat," "a deep dry roast," "a deep dry roast." The constant fault is too much heat, and this is unavoidable with light knives and small conducting wires. The attendant keeps his hand upon the switch and the operator calls for more or less current according to the density of the tissues and their vascularity



FIG. 8.—Byrne's own removal of uterus by cauterization.

As soon as the vagina is freed, progress in the loose cellular tissue in front or behind the cervix goes easily—one dissects and one shoves. The slight curve of the knife and its blunt edge clear away the bladder rapidly. The posterior section is freed to the cul-de-sac. We next have the flat band of the broad ligaments to handle. Keeping away from the uterus and a safe distance from the ureter, the base of the broad ligament and the uterosacral ligament are cooked and severed. As we approach the uterine it may sometimes be dissected out by the knife, not too hot, and then carefully shrivelled, not with the edge, but with the flat of the knife. As is well known,

the desired traction pulls into the field and away from the ureter a short length of uterine artery comparable, in a way, with what is removed by dissection. The cautery knife then frees the broad ligament to its thin upper portion. Great care—and this is most important—must be taken by the assistants not to use the points of lateral tractors against the severed lower parts of the broad ligament, lest they drag the vessels open, if these have not been ligated. Ligation is very rarely needed. I have ligated one uterine artery.

Removal in two stages was often done by Byrne in that he cut away the lower section (Fig. 1), then “domed” the uterus with a second instrument, a coil of platinum over plaster, shaped like a finger tip. This has never worked well with me. The second piece is taken by the eversion and dissection method Byrne also taught. The spreading forceps—or a strong single tenaculum—drags progressively downward as the knife works upward (Fig. 2, B). Finally there is left only a fundus (Fig. 2, C).

It should be clearly understood that the operation is bloodless—or nearly so—only if the procedure is very slow. Quick severing leaves a mere crust of char. Jerky traction and prodding with retractor-points displace this crust. At the end of the operation one places the bicarbonate-carbolic gauze tampon of Byrne, or, as I prefer, zinc oxide gauze yard lengths, dusting vagina and vulva with bicarbonate of soda. These remain a week or more and are removed only when loose, lest roughness result in secondary hemorrhage. Suppuration and granulation go on for many weeks, but the convalescence is as quick (as far as the general strength and up-getting are concerned) as if one had done an ordinary knife-suture amputation of the cervix.

A drawback to the Byrne operation is the destruction of the specimen in some early cases. It is sometimes cooked through, and spoiled for microscopic confirmation of the diagnosis.

#### SUMMARY

Cervical cancer that is curable, is curable by partial cautery hysterectomy as often as by grave operations, and is attended with very low mortality and morbidity. These with the absence of shock, a lessened fear and readier consent, encourage new trial of the somewhat expanded Byrne operation. Removal of paravesical and paracervical tissues, together with the entire uterine canal, leaving only the fundus to peritonealize the operation; done with the

electrically heated heavy platinum knife, with finger in rectum, or thermometer in bladder, and sometimes with a hand in the abdomen, permit more extensive work than formerly, and promise better results.

168 CLINTON ST.

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A CASE OF FETUS AMORPHUS ANIDEUS, FROM DEPARTMENT OF OBSTETRICS AND GYNECOLOGY,  
YALE MEDICAL SCHOOL.\*

BY

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(With one illustration.)

THE specimen I have to present will be of interest, I think, for two reasons: first, because it is unusual, and second, because it serves to confirm one of the hypotheses advanced to explain the origin of teratomata.

*Case History.*—The course of pregnancy was normal, except for the fact that about four weeks before term a slight trace of albumin appeared in the urine. This did not persist long and the patient's blood pressure never rose above 130 mm. Hg. There is a history of twins on both sides of the family; the patient's great-aunt was the mother of twins and her husband's great-uncle was the father of twins.

Delivery occurred approximately upon the expected date. On account of perineal dystocia labor was terminated by low forceps. Immediately after the fetus was delivered a mass about the size of a hen's egg dropped into view. This was attached to the placenta and came away with it. During and subsequent to the third stage there was a normal loss of blood.

The fetus, a male, weighed 3225 grams and was 50 cm. long. It was alive and subsequently, its development was normal. Because of its unusual character and the fear of injuring the specimen, the placenta was placed at once in 10 per cent. formalin and not examined until the next day.

*Description of the Specimen.*—The placenta weighs 760 grams and measures  $18 \times 17 \times 1.5$  cm. Its shape is ovoid. The umbilical cord, 60 cm. long is inserted 4 cm. from the margin of the placenta. The maternal surface is covered with decidua. The cotyledons are well defined; a few calcareous deposits are present. The fetal surface of the placenta presents a few small infarcts.

To the edge of the placenta a kidney-shaped mass  $6 \times 4 \times 2$  cm. is attached by a pedicle 12 cm. long and 5 mm. in diameter. At

\* Presented at a meeting of the Section on Obstetrics and Gynecology of the New York Academy of Medicine, December 27, 1916.

the time of delivery it was noted that the tumor was hanging in the amniotic cavity of the normal fetus, and later the examination of the specimen confirmed the fact that it was not surrounded by an

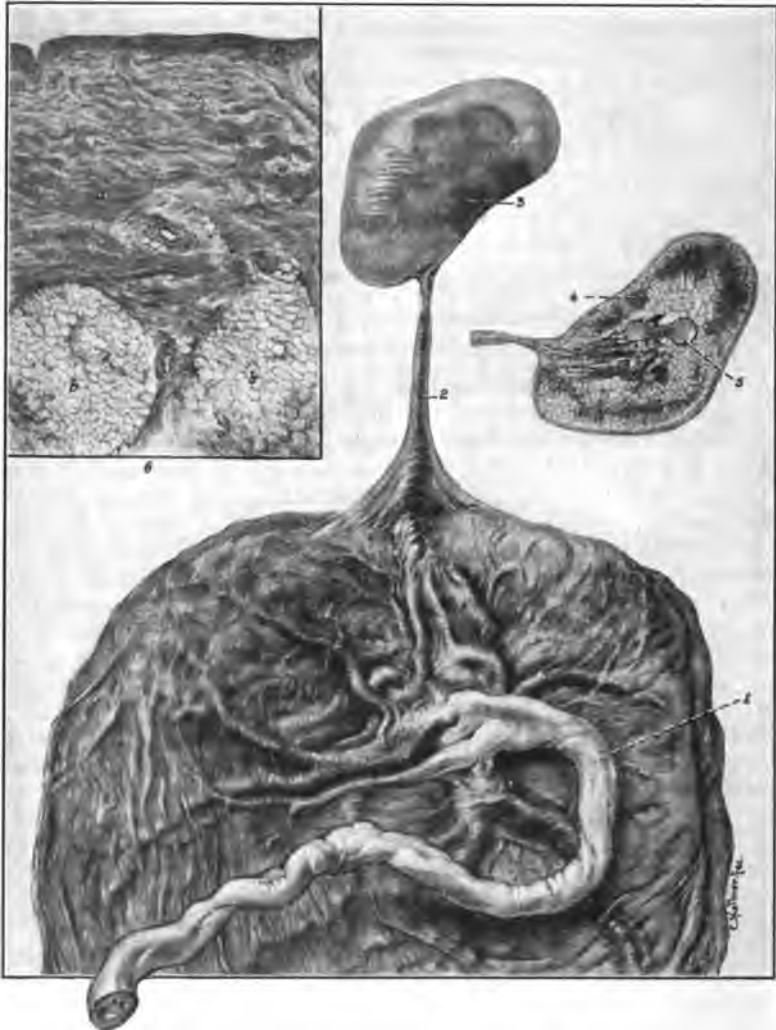


FIG. 1.—1. Cord of normal fetus. 2. Pseudo-cord. 3. Teratoma (external view). 4. Teratoma (cross-section). 5. Bone (two epiphyses and shaft). 6. Low-power magnification of cortex; a, fibrous tissue; b, fat.

amnion of its own. The pedicle by which the tumor is attached to the placenta is covered by amnion which stops at a point 1 cm. before the tumor is reached. The pedicle containing an artery and a vein is inserted on the tumor 1 cm. from the nearest pole. The vessels

with careful dissection are followed across the surface of the placenta and are seen to arise from the base of the umbilical cord of the normal fetus.

The shape and the brownish-red color of the tumor suggest the kidney. Also its surface resembles that of a kidney after the capsule has been stripped off. On section the tumor continues to suggest the kidney and may be roughly divided into two zones, the cortex and medulla. The cortex is brown, striated, and mottled. Beneath this there is a yellowish-brown zone evidently fat. In the center of the tumor there is a miniature bone. It has two cartilaginous epiphyses joined by a bony shaft 2 cm. long. The epiphyses measure respectively 3 mm. and 5 mm. in diameter.

*Stained Sections.*—The pedicle is covered with amnion. It contains two vessels, an artery and a vein, surrounded by Whartonian jelly. The pedicle, in other words, reproduces the structure of an umbilical cord, except for the fact that only one artery is present. Sections of the tumor show no epithelial cells upon its surface. The capsule consists of dense fibrous tissue. Beneath this there is loose connective tissue and fat. Stained by the Van Gieson method no muscle tissue is demonstrable except in the blood-vessels; no organs are present and no rudiments of organs.

*Discussion.*—The structure of the tumor compels the diagnosis of teratoma, and its vascular supply indicates that it is a fetus. A normal umbilical cord and a pseudo-cord with a common insertion upon the placenta establishes the fact that the case was one of single ovum twins. This vascular arrangement, furthermore, is accepted as proof that the twins possessed a common circulation through the vessels of the yolk-sac, and accordingly Ballantyne designates such cases *Allantoido-angiopagus twins*. In these circumstances ordinarily one fetus is normal while the other presents an extreme degree of malformation. If it lacks both head and limbs, as in this case, it is designated a *Fetus Amorphus Anideus*.

Specimens of the anidean fetus are very rare and thus far those described have exhibited a definite attempt toward the formation of organs as the heart, intestine, liver or kidney. Only in one case has this not been true and there it was uncertain that the tumor represented a twin. "I have met with a case," says Ballantyne in his *Antenatal Pathology and Hygiene*, vol. ii, page 627, "which was either an acormic paracephalus or a dermoid cyst expelled per vaginum in labor; it was an osseous box, like a cranium, with a pedicle and vessels running in it. Unfortunately, the placenta of the normal child born at the same time was not kept." The state of preservation of the specimen in the case here reported leaves no doubt that we are dealing with an intensely malformed fetus and a teratoma which are one and the same.



Various hypotheses have been advocated toward explaining the origin of teratomata, namely (1) From polar bodies (Marchand); (2) parthenogenesis (Pfannenstiel); (3) from amputated and misplaced bits of the germ layers at an early stage in development (Cohnheim); and (4) from the inclusion of one fetus by another (Bonnet). The last hypothesis is the one most widely accepted, for specimens of single-ovum twins are plentiful in which the two bodies are joined and even in which one partly includes the other. Therefore, it is not difficult to understand that in some cases the inclusion may be complete. But, on the other hand, the objects (teratomata) found in adults composed of derivatives of all the germ layers do not reproduce the structure of the body, do not represent an embryo or fetus. The irregular arrangement of the tissues in these objects distinguishes them and indicates their classification among the tumors. Consequently, the demonstration of an imperfect fetus joined to another more perfectly developed does not conclusively establish the fetal inclusion theory of the origin of teratomata. What is needed also is the evidence that an ovum may give rise simultaneously to a fetus and to a teratoma. This phenomenon is illustrated by the case just reported.

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FIFTEEN YEARS' EXPERIENCE WITH THE  
INTERMEDIATE REPAIR OF THE  
INJURIES OF CHILDBIRTH.\*

BY

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For the first ten years of my practice, I repaired all the injuries of childbirth immediately after the woman's delivery, as I had been taught to do while a medical student and as all my colleagues were doing. But in the course of time, I accumulated some very disagreeable experiences.

A woman whom I had primarily repaired would report for her final examination at the end of six weeks; I would often be far from satisfied with the repair that I had made; in fact would be very much disturbed by the appearance of the genital canal. In the course of two or three months the pelvic condition would become even worse and the patient would complain of the symptoms of inadequate support. What was still more distressing, I was hearing occasion-

\* Read before the Philadelphia Obstetrical Society, Jan. 4, 1917.

ally of my patients falling in the hands of other surgeons who were obliged to tell them that they needed a repair of the genital canal, although I had told them that I had made such a repair directly after the child was born.

I finally felt that if I claimed to be a specialist and an expert in this work I could not afford to confess that my work had been so poorly done, that it had to be done over again by myself or someone else. So I began experimenting with later repairs of the genital canal, waiting one day, two days, three and five days and a week in series of cases in the University Maternity. I soon discovered that it was perfectly possible to make these repairs in a satisfactory manner if I waited sometime after birth and I found out what everyone else had with the same experience, that I could uniformly repair the whole genital canal successfully including the cervix, if I waited as long as five days, but not the cervix before this time without too many cases of infected endometrium following the operation. I should have realized this long before. It is perfectly obvious that the repair of the genital canal, requiring accurate diagnosis, and somewhat delicate work cannot possibly be done satisfactorily directly after childbirth; perhaps in the middle of the night with a poor light; without adequate assistance; with the patient lying across a bed; with the tissues bruised, edematous and distorted and the field of operation obscured by a profuse bloody discharge; whereas by waiting for a return of the tissues to a more normal condition; by operating at a convenient hour of the day with proper assistance and implements including a portable operating-table, it is perfectly possible to repair the whole genital tract, pelvic floor, anterior wall and cervix as satisfactorily as can be done by a secondary operation.

In the fifteen years that have elapsed since I adopted this practice, the number of cases operated upon by my assistants and by myself has literally mounted into the thousands, and includes all kinds of cases; the best class of private patients, hospital patients and the denizens of the slums in my out-patient service; so that I am in a position to state that the intermediate operation imposes no disadvantage upon any woman, and can be performed with the same certainty of success that we obtain in a secondary operation.

Why is it then that so many professed specialists and experts in this work still persist in the performance of an immediate repair? I must confess that I can find no satisfactory answer to this question. I wish I could exhibit to the Society two patients, examples of many, whom I have recently observed and upon whom I have operated;

one repaired three times by a specialist directly after her delivery; and the other twice by another one with a result of which anyone who takes a pride in his work ought to feel ashamed. When I informed these patients that a plastic operation was required, their facial expression and their exclamations that their injuries had been repaired by men they supposed were experts were reminiscent to me of my own experiences more than fifteen years ago.

It is easy enough to understand why the general physician who does obstetrics casually as a necessary part and often a disagreeable part of his general practice still persists in the old-fashioned immediate repair. It is more agreeable to his patient; he may not have acquired the skill to do these operations properly; he lacks the necessary instruments; cannot command the necessary assistance and feels that for the fee he receives he cannot afford the extra time required for an intermediate operation. These reasons are not creditable to the physician nor would they be satisfactory to the patient, if they were known, but they have their weight. Why the expert and specialist should still persist in this faulty procedure I cannot for the life of me understand. Their results are no better than mine were fifteen years ago and it is just as necessary for them or for someone else to reoperate upon their patients as was the case with me before I dropped this antiquated practice. One can easily imagine the sensation of the patient who has paid an extra fee for expert attendance and then finds that in this matter of the injuries of childbirth she might as well have had the care of an ignorant midwife.

It is unquestionably more agreeable to the woman when she recovers from the anesthesia of her labor, to be told that her injuries are repaired and that she requires no further attention. It is no doubt disagreeable for such a patient to be subjected to a second anesthesia during her puerperal convalescence and to undergo even a slight operation. But in the long run, is not the latter course the more expedient and the better one. I for one prefer it to the other plan and would rather lose patients because they objected to a disagreeable procedure recommended for their own good, than to lose them because they found out eventually that my claims to be a specialist and an expert were a sham.

As long as the present condition of affairs continues, it is hopeless to look for any progress. The same enormous number of women injured in childbirth will struggle through life more or less disabled, a discredit to the medical profession, for there is no excuse for a persistence of these injuries unrepaired; there is no valid excuse for

them in any woman after she leaves her bed at the end of her puerperal convalescence. And yet of the 2,500,000 women delivered in the United States annually, a million more or less are added every year to the ranks of the comparatively unfit from this preventable cause.

How shall this unsatisfactory situation be improved? Reform must begin at the top before we can expect the rank and file to show improvement. I read in a book on obstetrics written by a professor, the sentence being printed in italics, that all injuries of the genital canal must be repaired immediately after labor. I wonder why. The author of this work has not had as much surgical training or experience as some of my friends of this Society who are still doing immediate repairs. It is fair to conclude, therefore, that his results are no better than those I see here. Why, therefore, should students be advised to continue a practice which is certain to have such a large proportion of dismal failures?

In another work on obstetrics, again by a professor, I read the statement that the author has tried intermediate operations for the injuries of childbirth but has not found them satisfactory. My answer to this statement is that anyone who cannot do intermediate operations with uniform success needs a post-graduate course in plastic surgery, which it appears would not be inappropriate in this instance for in another part of the same book occurs the statement that the opening of a mammary abscess is "A formidable operation" which would not argue for a very varied or extensive surgical experience on the part of the author.

The root of this evil lies in our provincialism in separating gynecology from obstetrics in our medical schools, a queer practice seen only in America, and one which is fatal to progress in both branches. The so-called gynecologist is ignorant of the greater part of woman's physiology and pathology, while by this plan, the specialist in obstetrics although dealing with a surgical subject is often denied all opportunity for surgical experience and training. One sees some curious examples of the ill-effects to be expected from this arrangement: Professors of gynecology mistaking a case of twins with hydramnios for an ovarian cyst and recommending immediate operation; overlooking a cancer of the cervix in a woman who happens to be three months pregnant; incompetent to reduce an inverted womb by taxis; performing operations that never would be considered if the operator were more familiar with the chief event of woman's life, the process of generation; and so on.

On the contrary, it is a common experience to find professed ex-

perts in obstetrics incompetent to deal surgically with some of the most urgent and important complications in their patients, directly connected with the act of child-bearing. I have known such a specialist to balk at a nephrectomy for a surgical kidney following infection in the puerperium and what can be expected of such a person suddenly confronted with a rupture of the uterus and intestines pulled loose from the mesentery, demanding an immediate hysterectomy with an anastomosis of a resected bowel, a kind of case with which a large maternity may have to deal at any moment? Fortunately there is evidence of our awakening to the folly of this system, in the abolition by many of our most progressive medical schools of a separate department for diseases of women and its incorporation with the department of obstetrics where it naturally belongs.

When we have secured in this country teachers of obstetrics in our medical schools who are insured a sufficient training in surgery to make their views on a surgical subject authoritative and when the specialists of the country reach an agreement as they will in time as to the advantages of an intermediate repair of the genital canal and the inadequacy of immediate repair the task will still remain of instructing the general physician and the medical student about to enter practice, in the technic of plastic surgery and the most successful way to repair an injured genital canal after labor.

There ought to be no difficulty in doing this. In my department at the University of Pennsylvania every undergraduate student assists me or some of my staff directly in seven or eight of these operations, intermediate and secondary. No student leaves the school unprepared to do this work in a satisfactory manner. There is no reason why such a plan should not be universally adopted in our medical schools. Imagine the vast improvement in womankind if every woman after labor was insured immunity from the injuries of childbirth by their proper repair, for it is understood, of course, that these injuries cannot be avoided. I know of no single improvement in medical practice which would have such a wide-reaching beneficial effect upon the community at large. Instead of splitting hairs on a lot of questions of subordinate importance in obstetrics I wish the teachers of this subject would get together and agree upon the proper way of dealing with these injuries of childbirth. It is useless to pretend that this subject is properly dealt with at present. The vast number of women in this country suffering disability from these injuries is proof enough that the medical profession has so far failed to do its duty to the community in this respect. In addition to the

incorporation of the surgical treatment of diseases of women in the obstetrical department of our medical schools, there are two other reforms to be accomplished before a basis is reached from which to advance in the science and art of gynecology, using that word in its proper sense to mean *all* the physiological and pathological phenomena peculiar to women. One is in the management of the non-teaching hospital: the other is in the conduct of the individual specialist.

A recent occurrence will illustrate what I mean by the necessity for reform in hospital management. A woman with an acute inversion of the uterus admitted to a hospital with a separate staff for obstetrics and so-called gynecology, was referred to the latter: that is to say was diverted from the part of the hospital in which she should have had the best treatment if the staff were competent to hold their positions, to another in which the training of the staff by no means insured such competency. This kind of hospital management is not only ill-informed and unintelligent: it is wrong; a betrayal of trust to contributors and patients, for the patient is not insured the best treatment possible.

Finally the individual specialist in obstetrics must slough off the provincialism of the past generation when there were no hospitals for women in this country worthy of the name. It is not his function in order to acquire experience, to load himself up with unlimited engagements to attend women in normal labors, in their homes, chaining himself to one spot, never seeing others' work, and limiting his surgery in which to deserve the name of expert he must keep himself constantly at the highest grade of efficiency. Such a mode of professional life leads inevitably to an abnormal self-sufficiency with its mental ankylosis, cerebral sclerosis, shrinkage of the intellect, contraction of the mental horizon, a cessation of initiative and progress. But without waiting for the completion of these reforms, why not address ourselves immediately to the largest question at present confronting specialists in the treatment of women.

More than half the women who consult a physician on account of something peculiar to their sex are suffering from lacerations of the birth canal. These figures prove that the immediate repair hitherto generally employed has failed. It seems to me high time, therefore, for us specialists to practise and to advocate to the profession generally the intermediate operation which can be depended upon to give uniformly successful results.

1821 SPRUCE STREET.

## SURGICAL TRAUMATISM AS A CAUSE OF RECURRENCE IN UTERINE CARCINOMA.\*

BY

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It has been shown by Bloodgood that in carcinoma of the breast, the chance of recurrence was increased by a preliminary excision of a specimen for diagnosis especially when the radical removal was not immediately carried out.

The trend of modern surgery is toward the removal of growths without handling, without cutting into the growth, but by carefully keeping outside in healthy tissue, and as early as possible cutting off channels of metastasis, for example in the breast operation which begins in the axilla.

There can be no doubt at the present day of the possibility of direct inoculation of new areas by transfer of cancer material. Implantation has been observed along suture tracks, a nest of cancer cells appearing where each suture of a wound came through the skin. Metastasis may occur through a line of communication formed by the blood stream in a direction distal to the primary lesion, and not central such as is seen in the usual case of lymphatic metastasis. How else account for a cancerous growth in the bones of the tarsus, the primary lesion being in the bladder. (See case observed throughout its development and reported by the writer. *New York Medical Journal*, May 27, 1911.)

Details of three cases of bone marrow metastasis from carcinoma of the stomach are given by Harrington and Teacher (*Glasgow Medical Journal*, February, 1915.)

In the annual report of the Imperial Cancer Research Fund, (*Lancet*, July 24, 1915, p. 191) the formation of metastasis is described as consisting of two phases. The first is the passage of tumor cells through the endothelial layer of the lymph or blood-vessels in the primary focus. The second phase is connected with the mechanical transport of these tumor cells, the arrest of intravascular emboli, and their vascularization and establishment as a secondary growth in a new locality. These processes at the place of arrest have been experimentally studied for example by Takahashi, who made intravenous inoculation of tumor emulsion of

\* Read before the Obstetrical Society of Philadelphia, January 4, 1917.

carcinomata and sarcomata and observed the growths resulting in the lungs.

A curious and interesting phase of this study was that "the percentage of success on subcutaneous implantation furnished no indication of the probable fate of intravascular emboli."

Since then it can be shown experimentally that tumor cells can enter vascular channels and be there transported to a new radius of development, how can anyone doubt the enormous importance of avoiding all squeezing of new growths accompanied by punctured wounds such as takes place in the use of double tenaculums or forceps especially of the lion jaw variety. No one would think of doing this at the present day in the case of a tumor of the breast, or an epithelioma of the face, especially if after grasping with the instrument strong traction were made. Yet it has been customary to do this with the uterus with very little thought. We are all familiar with the process of inoculation of tissues by the unclean instrument but at least in the case of the uterus we are slow to apply the same consideration to the matter of transfer of *materies morbi* of cancer by a blunt-pointed instrument into deeper tissues and thence into the general circulation.

The time required for any given blood corpuscle free in the blood stream to circulate from the periphery to the heart and back to the periphery again has been variously calculated in man as from fifteen seconds to twenty-three seconds. (See *Journal of Physiology*, xv, 1, 1894, Stewart.) Hering and Vierordt calculated that it required the time of twenty-six to twenty-eight heart beats in the larger animals to make a complete round. (See text-book of Physiology, Howell, 1915, p. 488.) For example the time occupied between the start of a cell from a carcinoma to the heart and out to some peripheral point of lodgment, if such a cell be free in the blood stream must be calculated not in hours, not even in minutes, but in *seconds*, so that there is no time for operative excision to secure safety.

For the time being one may put aside the question as to what factor causes cancer and stimulates the growth of cells. It is sufficient for this argument, that where cancer cells are transferred in the blood stream the activating agency goes with them and under proper conditions a new nidus forms. To be sure many of such embolic cells die, but some may not and under proper conditions undoubtedly they do not.

The bearing of this is obvious upon the clinical study of a possibly malignant condition of the uterine cervix. In order to see, especially when the parts are small, the temptation to use a tenaculum is very



great. This may indeed be done several times by one or more practitioners before the operator is consulted. Has he been himself sufficiently cautious is the question of this paper. How about the excision of a piece for the microscope, to be followed by radical operation after a week or more. In the case of the breast, Bloodgood has shown that permanent cure rarely follows this plan. Why is not the same true in the case of the uterus?

How many patients in whom metastasis has not already occurred have we been consigning to a probable ultimate recurrence by the preliminary use of the dilator and curetment of the endometrium for diagnosis, thereby causing metastasis? It is not a pleasant thought that this may be no considerable factor in the unsatisfactory status of operations for carcinoma of the uterus.

It took the profession a long time to become convinced that so apparently simple a matter as previous digital examination of the woman in labor made an enormous difference in the mortality following Cesarean section. Those did best who had never been examined. It took us a long time to grasp the fact that the tumor must be left alone and that the axillary channels must be cut off as an early step in excision of the breast. Have we not been as slow to learn in the case of the cancerous uterus?

Clinically it is found very difficult to draw the uterus into view or to hold it in position for operative procedures without recourse to the tenaculum. While inconvenient, however, a grasp may frequently be obtained outside of diseased tissue and this should always be done, or the tissue grasped should first be cauterized.

A more serious difficulty is in deciding upon the question of malignancy without excising a piece. In a well-developed carcinoma of the cervix, however, the clinical evidence is sufficient and the microscopical evidence can come later. I believe that the greatest safety can be obtained by a slow but thorough cauterization of the diseased area followed at once by hysterectomy. This is open to the very serious objection that some cases will be operated upon in which the use of the cautery has obliterated the evidence of the original disease and the subsequent microscopical report will be negative. This is ruinous to a surgeon's scientific report and analysis of a series of cases. This report is dear to his heart. He is moreover liable to be attacked and criticised for unnecessary operating, perhaps by some whose judgment and skill are far less than his own. However, the trained clinician with a conscience will save more lives in this way than any other.

It is important to recall in this connection that many of the patients

in whom the suspicion of carcinoma arises, are well advanced in life, are suffering from the injuries of childbirth which need repair; have uteri which are too large, too heavy and too low, while the degenerations or injuries of the cervix are often so serious as to require its amputation. To these conditions is added the doubtful meaning of abnormal bleeding. At times the patching up procedures are almost as formidable as a vaginal hysterectomy would be; while the future would be still uncertain as to malignant degeneration.

No better late results in carcinoma of the uterus have been shown than those of the late John Byrne of Brooklyn. The fact used to be mentioned to the disparagement of his results that he used the microscope but little. In a paper before this Society read by invitation Dr. Robert L. Dickinson of New York dealt with Dr. Byrnes' method, but it was thought necessary by speakers who discussed the paper to point out that Dr. Byrne was an able and conscientious clinician of large experience, who was accustomed to operate in the presence of well-known surgeons capable of recognizing cancer, in order to justify the absence of microscopical data.

The fact that he was not dependent on the traumatism involved in obtaining a specimen for preliminary diagnosis, was probably a considerable factor in the patient's freedom from recurrence. This point has been largely overlooked. The second factor was his method, by which he shut off without any previous manipulation all channels of metastasis by cutting with the cautery knife outside the disease, his method leaving a mere shell of a fundus and no cervix.

It may be recalled that the pathological diagnosis of tumor tissue by the microscope is a highly specialized art and that in early or borderline cases a conscientious difference is noted in the opinions of various men. A final opinion is often impossible without the entire organ and the clinical history. It is also true that the clinical diagnosis can very often be made so surely that the risk of a preliminary microscopical diagnosis should not be assumed.

While it will undoubtedly take courage to follow out the plan in some cases, the following course of action may be adopted by the experienced clinician.

(a) Obtain a careful history and use all accessory means of diagnosis such as sight, touch and if necessary the response to harmless lines of treatment used temporarily.

(b) If clinically positive state the situation to the patient or her friends and do a radical operation by the method selected *after destroying the diseased area with the cautery.*

(c) If unable to avoid making a preliminary microscopical diag-

nosis, never excise a specimen except with the cautery knife and for immediate diagnosis and immediate operation. Use no hooks.

(d) Obtain microscopical confirmation afterward if possible, but do not in the presence of clinical probability produce dissemination in a patient of cancerous age by surgical traumatism of an uncauterized growth.

(e) If there is no suspicion of malignancy it goes without saying that major operation must be done only for the usual definite indications.

In some cases then the decision for or against malignancy becomes a matter of opinion and judgment with the microscopist and, just as justifiably, it may become a matter of opinion with the trained clinician.

1831 CHESTNUT STREET.

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## THE TREATMENT OF ECLAMPSIA WITH ESPECIAL REFERENCE TO VAGINAL AND ABDOMINAL SECTION.

BY

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THE treatment of eclampsia may be divided into (1) the control of the convulsions, (2) the elimination of the poison, and (3) the emptying of the uterus. During the attack, oxygen, if at hand, should be given, and the patient should be prevented from biting her tongue or injuring herself in any way. For the control of the convulsions, veratrum viride, chloral and morphine have been most widely used. Chloral in large doses is very extensively used in the French and German clinics, and there can be no question of the great value of the drug given either alone or with the bromides. Veratrum viride seems to be gaining steadily in favor. The drug is a diaphoretic, diuretic, a powerful arterial and spinal depressant, causing general vasomotor paralysis, and as explained by Wood, the drug bleeds the patient into her own veins. There can be no question that the drug will usually control the convulsions if the pulse can be lowered to about 60. The late Dr. Jewett in a very large experience, never saw convulsions occur, with a pulse of 60, but occasionally we have observed convulsions even with a pulse of 50-60. We give an initial dose of 10 minims of the Squibb's fluid extract by hypodermic, and 5 minims every half hour there-

\* Read before the Brooklyn Gynecological Society, January, 1917.

after until the pulse comes to about 60. The drug is then given in 5-minim doses every two or three hours, in order to keep the pulse about 60. My experience with the drug has been very satisfactory, and I believe it to be the best for the control of the convulsions. Great caution must naturally be used in giving the drug to patients with a weak pulse, and in the latter class of cases chloral and nitroglycerin would probably be safer. The collapse which occasionally results from large doses of veratrum is promptly relieved by alcohol or morphine and no case of fatal poisoning by veratrum has to my knowledge been recorded.

It is, of course, necessary to give a reliable fluid extract, such as Squibb's, for many tinctures we have found to be practically inert. The treatment of eclampsia with morphine has never appealed to the writer, but the drug is used by men of large experience, with good results as we shall see later. Elimination is a most important factor in the treatment of eclampsia and we must consider therefore catharsis, colonic irrigation, lavage, diuresis, diaphoresis and venesection. If the patient is unconscious, catharsis may be obtained by the use of 1 or 2 minims of croton oil given with olive oil, placed on the back of the tongue. When the patient is very weak, it should be omitted. Another excellent plan is to administer 2 ounces of magnesium sulphate solution through the stomach tube after lavage has been done. If the patient can swallow, repeated doses of the sulphate of magnesia in concentrated solution may be given, but some writers prefer to give calomel with compound jalap powder. If the bowels do not move, high enemata containing mag. sulph.  $\mathfrak{J}$ i with castor oil  $\mathfrak{J}$ ii are given. Colon irrigation should be ordered every six hours, 3 to 4 gallons of 5% glucose solution being used at each treatment. After irrigation, it is well to leave several pints of hot saline in the bowel to promote diuresis and diaphoresis. Lavage is also a most valuable aid in eliminating the poison from the stomach. Diuresis and diaphoresis are both brought about by catharsis and colon irrigation, but hot packs and especially hot air baths are also very valuable aids in treatment. The pulse must be watched carefully, as marked depression occasionally follows the use especially of the hot pack. Venesection in cases where the pulse is strong and full with high tension, is of great value. If delivery is imminent the patient may be allowed to bleed in the placental stage of labor, or immediately after the completion of the third stage.

*Surgical Treatment.*—We believe that in eclampsia the uterus should be evacuated as soon as possible, consistent with the integrity

of the soft parts. The interruption of pregnancy offers the patient the best chance of recovery. Naturally a very great difference of opinion arises as to the proper method of procedure in these cases, for nearly every operation known in obstetric science has been advocated. We believe that the choice of method should depend upon the degree of softening and dilation of the cervix, the size of the pelvis, the parity and environment of the patient, and last but not least, the surgical skill of the obstetrician. For general use, however, in private practice and as a rule in the hospital, we advise the following treatment: If the patient is in the second stage of labor, the child should be extracted by forceps or version. In all operations ether or gas oxygen anesthesia should be the rule. If the patient is still in the first stage of labor, the treatment will depend upon the amount of dilation and the character of the cervix. If the cervix is very soft and easily dilatable, manual dilation should be used, followed by forceps or version. If the cervix is still rigid, and dilation slight, we advise the introduction of the modified Champetier de Ribes bag. The bag will soften and dilate the cervix, and later manual dilatation can prepare the way for operative delivery. Should eclampsia appear before labor has begun, we have generally advised the induction of labor by means of the bougie or rectal tube combined with the introduction of the modified de Ribes bag. These bags are invaluable for the induction of labor, and also for accelerating dilatation in tedious labors. One of the smaller bags is first introduced, and after expulsion, a larger size is inserted. The softening and dilatation prepare the cervix for subsequent complete dilation and operative delivery. Usually the bougie and bags will cause labor pains to begin within a few hours, but if labor does not commence and the patient continues to have convulsions, operative measures are imperative.

In the hospital, in the hands of expert surgeons, we believe that vaginal hysterotomy will prove to be the best method of procedure in all cases of eclampsia occurring from about the fifth to the eighth months of pregnancy when the cervix, especially in the primipara is long and rigid. Within an hour at most, the uterus is emptied, the incision sutured, and the patient put to bed. Abdominal section has now been used in many hundreds of cases, but as a rule the operation has been chosen because of disproportion between the fetal head and the pelvis, contracted pelvis, or rigid unyielding soft parts where ordinary measures have failed. Within recent years however, the operation has been performed many times with the eclampsia as the chief or only indication, and it is along that line of

thought that I will a little later direct your attention. Having considered the treatment of eclampsia in general, let us now take up some of the statistical studies which bear directly on various plans of procedure already referred to.

Some interesting figures on the Expectant Treatment of Eclampsia, have been published by Lichtenstein(1).

The author has treated ninety-four cases of eclampsia by this method with five deaths = 5.3 per cent. These deaths occurred among the intrapartum cases, fifty-six in number. Of 102 fetuses thirty-eight were lost = 37.3 per cent., nearly the same as under active therapy. If only viable children are counted, there were sixteen deaths in seventy-five viable births = 21.3 per cent., which is much lower than under active therapy (36 per cent.).

In but one case was vaginal Cesarean section done as a last resort. Aside from this there was no Cesarean operation, no Bossi dilatation, no cervix incision. There was no tear in the cervix and no bladder injury. The operations for delivery were limited to forceps, version, breech extraction, perforation and manual separation of the placenta. Venesection was used as a routine procedure. In fifty-one cases convulsions ceased after a single venesection. In several others they ceased after additional venesection. It is to be noted especially, that seventy-four mothers were saved without a break in the series, which covered a period of sixteen months. The author collects from literature 343 cases in which the expectant and Stroganow methods were used by a certain number of obstetricians, including himself (not including Stroganow's own material). In these 343 cases the maternal mortality was 12 per cent., which is considerably less than the figures of several who have used active treatment (Freund 17.2 per cent.). The mortality in the authors clinic (Zweifel's) under the old active management was 18.5 per cent. The author states that Stroganow's last figures were 916 deliveries with about 8 per cent. maternal mortality. Tweddy treated seventy-four cases of eclampsia with narcotics, gastric lavage, and enemas, and had only 8.1 per cent. maternal mortality. His old mortality under active treatment was 35.3 per cent. Other figures could be given which under venesection alone show the same low mortality.

It is evident that among such large figures (between 1300-1400) results of expectant or nonoperative treatment point to a marked advance in our control of these cases.

The author states that advocates of the active method claim that if the uterus can be evacuated early enough there need be no mor-

tality. Thus Fromme had a clean record of no deaths when the uterus was evacuated after but two attacks had occurred and Freund had also a clean record of forty-seven recoveries in cases delivered after one attack. This simply means unwarrantable selection of cases. The author himself can point to a series of thirty-four recoveries of antepartum eclampsia in which from one to ten attacks had occurred. We can only state that early treatment does better than late treatment. The expectant method of the author is a combination of venesection and Stroganow's method with delivery by the customary procedures when advisable.

The most recent report of the conservative treatment of eclampsia by morphine is that of McPherson(2), published in the Bulletin of the Lying-In Hospital, January, 1917. He states that "There have occurred thirty-five cases of convulsive toxemia, in all of whom the treatment later to be described was administered: Of these thirty-three mothers were discharged from the hospital well, fifteen children were born alive and were discharged well, fourteen children were stillborn and six children died within a few hours after birth. This leaves a maternal mortality in the series of 8.6 per cent. and a stillbirth mortality of 40 per cent. Comparing these figures with those quoted in the published articles of most operators the author states that it will seem as if the result speaks for itself, for so far as the mothers were concerned, the mortality has been reduced by over two-thirds, and the stillbirth mortality has not been increased.

All of these cases were true convulsive toxemias having had one or more convulsions before admission and all were treated in approximately the same way. His plan of treatment is as follows: Immediately on entrance to the hospital, the patient's blood pressure is taken, a catheterized specimen of urine obtained and she is put into an isolation room which is darkened and as much quiet as possible obtained. She is then given by hypodermic injection  $\frac{1}{2}$  grain morphine sulphate, her stomach is washed out, 2 ounces of castor oil is poured down the tube, at the end of the lavage, and she is given a colonic irrigation of 5 gallons of 5 per cent. glucose solution. If the blood pressure is over 175 systolic, phlebotomy is done and a sufficient quantity of blood is extracted to bring the pressure down to 150. The patient is now kept quiet and  $\frac{1}{4}$  grain morphine administered every hour until the respirations drop to eight per minute. At this time convulsions have usually ceased, the patient will have fallen into labor, and, as has happened in practically all of our cases, will deliver herself in a short time. Of the cases included, twenty-three were spontaneous deliveries, nine were de-

livered by low forceps, two by version and breech extraction, one breech presentation and delivery. McPherson adds that it is interesting to note that all the patients in whom a fetal heart was heard on admission were delivered of living children, and that in none of these were there any signs whatever of the morphine which had been administered to the mother, which is interesting in view of the enormous amount of unfavorable comment caused by the opponents of scopolamin-morphine amnesia, where as a rule only 1-6 of 1 grain of morphine is used during the whole treatment. In conclusion the writer says, it is fully recognized that the number of cases reported is very small, but taken in conjunction with the similar reports published by other authors, it would seem as if in the outlined treatment of the convulsive toxemias we had a method which was far in advance of our previous ones and which should merit careful and thoughtful attention of all those men under whose observation this class of cases may fall.

At the Harlem Hospital we are under the same disadvantages as other city hospitals, in receiving patients who are desperately ill, many of whom are literally sent into the hospital as a last resort, only to die within a few hours after admission. Under such circumstances, favorable reports cannot be expected, and are quoted not only as a matter of interest, but also to call attention to the fact that if cases of eclampsia can be seen early enough, if possible, immediately after the first seizure, maternal mortality could be very greatly diminished. We have been able to collect thirty-four cases, of which twenty-two recovered, and twelve died, giving a mortality of 35 per cent. One patient died three hours postpartum, two died four hours postpartum, two died seven hours postpartum, two died the day of delivery, and one, twenty-four hours postpartum. Excluding five cases where death occurred within seven hours, the maternal mortality is 21 per cent., which compares with mortality given by DeLee, of 20 per cent., Williams, 20-25 per cent. and Hirst, 30 per cent. in private practice. Hirst quotes a mortality of 33 per cent. at the University of Pennsylvania Maternity, but excluding cases where death occurred in less than twelve hours, the mortality was 13 per cent. At the Harlem Hospital, of twenty-one primiparæ, six died, a mortality of 28 per cent. Of thirteen multiparæ six died, a mortality of 46.1 per cent. These figures show not only the great severity of eclampsia, but the great need of commencing active treatment at once, and materially improving the methods of dealing with such a toxic and dangerous condition. The infant mortality in twenty-eight cases where pregnancy had advanced to seven



months, or over, and where the child was probably alive, was a little less than 50 per cent., truly a large death rate.

Including the deaths among children which probably occurred within a few weeks or months, the mortality is undoubtedly very much higher. Curiously, in fifty-eight cases of eclampsia treated at Harlem, by all methods, there were five cases of twins, or  $1-11\frac{3}{4}$  (8.6 per cent.) compared to 1-24 (4.1 per cent.) in Peterson's 500 cases, and  $1-9\frac{1}{2}$  (10.5 per cent.) of Lichtenstein's cases published in 1913, thus showing the large part which twin pregnancy plays in the etiology of eclampsia. Twelve cases of postpartum eclampsia show a mortality of 16.6 per cent., which is higher, as we shall see than the statistics for abdominal section in antepartum eclampsia.

*Vaginal Hysterotomy.*—This operation which was brought so prominently before the profession by Peterson's(3) report of 530 cases, published in 1911, has since that time been performed many hundred of times. The maternal mortality of the entire series, performed by 118 operators, was 23.4 per cent. Some individuals reported far better figures: Veit, for instance, in forty-two cases, had a mortality of 11.9 per cent., Winter in thirty-four cases, 8.8 per cent., but several others with large series showed a mortality of 22-25 per cent. Peterson, in order to show how much better the prognosis was when operation was performed early, quoted thirty-one cases where operation was performed in from one to three hours after the first convulsion, with a mortality of 3 per cent., whereas, in fifty cases operated on six to twenty-four hours after the first attack showed a mortality of 28 per cent. He also found that emptying the uterus terminated the convulsions in but 50-60 per cent. of the cases, irrespective of the method of delivery, and that when convulsions cease the mortality was 18 per cent., whereas if convulsions continued, the mortality was 28 per cent. Of 315 viable children sixty-seven died, a mortality of 21 per cent. The smaller the number of convulsions, the better was the progress for the fetus. Version after section improved the fetal mortality, while the use of forceps improved the maternal mortality. We have collected 125 cases of vaginal section partly from the literature, and partly from unpublished reports sent to the writer by the following obstetricians, to whom we express our grateful thanks: Polak six, Pomeroy three, Hussey nine, Edgar two, Cary two, McChesney one, Zimmerman two, Beach one, Cherry one. Through the courtesy of the Lying-In Hospital, we are able to report thirty-three cases, Potter(4) has reported eleven, Beckmann(5) of Petrograd forty-three, and from the records of the Harlem Hospital, Stein four, Cherry five, and the

writer five, making a total of 128 in all. Of this number 103 women recovered, and twenty-five died, giving a mortality of 19.5 per cent., which is 4 per cent. below the mortality of Peterson's 530 cases (23.4 per cent.). In Beckmann's series of forty-three cases, five were lost, giving a mortality of 11.6 per cent. In the Lying-In Hospital series the mortality was 21 per cent. In Potter's series of eleven cases, the mortality was 27 per cent., in our Harlem Hospital series of fourteen cases, the mortality was 28.5 per cent. Two of the four fatal cases died a few hours after admission, and one other died of gastric dilatation and lobar pneumonia.

I must confess to a feeling of disappointment in these figures, for we feel that with prompt operation, the mortality should be lower. It was impossible in this series to calculate the infant mortality, because of the insufficiency of data obtained. In our Harlem series, four children were viable, of whom three lived. There is no question but that in competent hands, the operation enables one to promptly empty the uterus and thereby put the woman in the best condition for treatment, but it has not yet been proven that vaginal section is the best plan of treatment in the early cases, from the fourth to the eighth month of pregnancy. A large series of cases operated upon very soon after the first attack would, we feel confident, show a very small mortality.

*Cesarean Section.*—Peterson(6) in 1914 published the statistics of 500 abdominal sections for eclampsia, and so completely was his work done that valuable deductions may be drawn from his figures. Before 1908 the maternal mortality was 47.97 per cent., between 1908-1913 the maternal mortality was 25.79 per cent. In one series of ninety-one cases by thirteen operators, each with five or more cases to his credit, the mortality was 18.68 per cent., and in this series excluding septic and moribund cases the mortality was 13.15 per cent.

In sixty cases, where there had been not more than five convulsions, only one or two vaginal explorations, and no attempt to deliver from below, the mortality was 15 per cent. Since 1908 and reckoning only viable living children, the fetal mortality was 3.62 per cent. Including deaths of infants within the first few days, the mortality rose to 10.69 per cent. Naturally, primiparæ comprise the larger number in the series, 83.75 per cent., and the maternal mortality increased with the age of the patient. Peterson's figures show therefore, a maternal mortality (25.79 per cent.) not excessively high, taking the series as a whole, and a percentage in the series of ninety-one cases by thirteen experienced operators,

excluding septic and moribund cases of 13.15 per cent. which is surprisingly low. Again, the fetal mortality in the entire series was 3.62 per cent., certainly a wonderful low infant mortality rate. Peterson claims and rightly so, that the operation has never been given a fair trial, performed soon after the first convulsion. He concludes his paper by raising the question whether eclampsia itself is an indication for Cesarean section, and giving his opinion that in the present state of our knowledge, with normal pelves and soft parts, there are more successful methods of treatment. We feel confident that Cesarean section performed in primiparæ, at or near term, with undilated cervixes, soon after the first seizure would give a lower mortality than Peterson's series, and if so, would not the small fetal death rate be a very excellent reason for performing the operation? To be sure, many of the infants are toxic, but it may be presumed that with a prolonged labor, the child will probably be more toxic, and indeed the small chance of surviving which some children have is practically taken away from them, by a long labor and operative delivery. The fewer the convulsions, and the earlier the delivery, the better surely will be the prognosis for the child. The writer has sent letters to a number of surgeons and hospitals, throughout the country, asking for statistics on abdominal section with eclampsia, and up to the present time, he has obtained records of 174 published and unpublished cases, from the following operators and institutions shown in table on p. 771.

We have included in this series only patients who have had at least one eclamptic seizure. One patient had Cesarean for the second time for eclampsia. The parity was known in 113 cases, of which eighty-seven were primiparæ, or 77 per cent. The list could have been very greatly increased had we included cases of Cesarean section in toxemic patients, who were so-called preëclampsics! Many of these women were in a very serious condition, but we deemed it better to adhere to the rule of including only patients who had had one convulsion. Many operators of experience reported at least one Cesarean section for toxemia without convulsions and expressed themselves in favor of the operation under conditions of undilated cervix, primiparæ, at or near term with living child. Swain of Boston, reports five Cesarean operations on patients with preëclamptic toxemia, all growing worse under eliminative treatment, all primiparæ, at or near term, without maternal or fetal mortality! He believes it to be the operation of choice with a viable child and unchanged cervix. In this series of 174 Cesarean operations with eclampsia, twenty-eight women died, a maternal mortality of 16.1

Operator or institution	Location	Unpub- lished	Pub- lished
Ill., E. J.....	Newark, N. J.....	29	0
Stowe, H. M.....	Chicago, Ill.....	24	0
Lying-In Hospital.....	New York, N. Y.....	21	0
Potter, J. W.....	Buffalo, N. Y.....	12	0
Humpstone, O. P.....	Brooklyn, N. Y.....	10	0
Burns, T. M.....	Denver, Col.....	12	0
Chandler, T. E.....	Boston, Mass.....	10	0
Redman, L. C.....	Lexington, Ky.....	5	0
Miller, H. A.....	Pittsburgh, Pa.....	5	0
Hirst, B. C.....	Philadelphia, Pa.....	4	0
Terry, I. B.....	New York, N. Y.....	4	0
Brodhead, G. L.....	New York, N. Y.....	4	0
Hellman, A. M.(9).....	New York, N. Y.....	0	3
Horsley, J. S.....	Richmond, Va.....	2	0
McClelland(8).....	Australia.....	0	3
Pfeiffer, Wm.....	Brooklyn, N. Y.....	2	0
De Lee, J. B.....	Chicago, Ill.....	2	0
Telfair, J. H.....	New York, N. Y.....	2	0
Edgar, J. C.....	New York, N. Y.....	1	0
Polak, J. O.....	Brooklyn, N. Y.....	1	0
Hussey, A. A.....	Brooklyn, N. Y.....	1	1
Zimmerman, V. L.....	Brooklyn, N. Y.....	1	0
Bishop, E.....	Brooklyn, N. Y.....	1	0
Robins, C. R.....	Richmond, Va.....	1	0
MacLean, H. S.....	Richmond, Va.....	1	0
Craig, W. B.....	Denver, Col.....	1	0
Ziegler, C. E.....	Pittsburgh, Pa.....	1	0
Supple, E. A.....	Boston, Mass.....	1	0
Mason, N. R.....	Boston, Mass.....	1	0
Williams, J. T.....	Boston, Mass.....	1	0
Welker, H. C.....	Norristown, Pa.....	1	0
Dorman, F. A.....	New York, N. Y.....	1	0
Stein, A.....	New York, N. Y.....	1	0
Brown, R. E.....	New York, N. Y.....	1	0
Newark City Hospital.....	Newark, N. J.....	1	0
Schweizer(7).....	Switzerland.....	0	1
Reddy, H. L.....	Montreal, Can.....	1	0
		166	8

per cent. In at least one of the fatal cases, the patient had been frequently examined, and efforts had been made to deliver from below, a fatal result which we feel should not be attributed to the method as applying to eclampsia cases. One of the women died of pneumonia, two weeks postpartum, another died of intestinal obstruction a few days after operation, one had a ruptured uterus at the time of operation and was septic, another was a case of neglected

intense toxemia. Two patients died twelve hours after delivery, in convulsions. Excluding these cases, the mortality was 12.2 per cent. In at least three of these seven fatal cases, the prognosis would probably have been favorable, had the Cesarean been performed soon after the first attack. One hundred and fifty-four children were alive when the operation was done, and of these twenty-nine died, a fetal mortality of 18.8 per cent. This list of deaths includes a case of the writer's, in which the fetal heart was very rapid before the section was done, and the child simply breathed several times before death which certainly could not be attributed to the operation, as the child would have been stillborn, had the patient been treated by ordinary methods. Two of the deaths were in premature twins, and in one series of twenty-nine cases, six children died within ten days. In another series of twelve cases, three very small premature infants died. Deducting the premature, poorly nourished infants of the series, which would probably have died in any event, the mortality certainly would have been much under 18.8 per cent.

In conclusion, we believe that conservative medical and obstetrical treatment will give the best results in the hands of the general practitioner, but we also feel confident, that early vaginal section skilfully performed, for cases of eclampsia up to the last six weeks of pregnancy, and abdominal section especially in primiparæ, but occasionally in multiparæ, with living children, late in pregnancy, with unchanged cervixes, and particularly with large children and slightly contracted pelvises, will offer the best plan of treatment. It should be understood, however, that the operation to be most successful should be performed as soon as possible after the first seizure, and with a minimum of vaginal manipulation.

50 WEST FORTY-EIGHTH STREET.

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## THE MANAGEMENT OF ECLAMPSIA.\*

BY

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SAUVAGES(1), in 1759, gave the synonym "eclampsia" to that state of pregnancy which is characterized by convulsions. This synonym was defined in 1867 by Cazeaux(2) as a series of convulsions in which nearly all the voluntary and often the involuntary muscles contract convulsively and which are usually accompanied by complete loss of consciousness and more or less prolonged loss of sensory or intellectual faculties.

Autopsies on women who have died in pregnancy associated with convulsions, reveal certain microscopic lesions in the liver and kidneys so frequently that by many they are considered characteristic of "eclampsia." These same lesions, however, are found in women who die without convulsions, so that the synonym of eclampsia has come to include certain cases of pregnancy toxemia which are not characterized by convulsions.

Eclampsia either with or without convulsions is often associated with congestion and edema of many internal organs, which lead to hemorrhages and thromboses throughout the body. The blood pressure is usually high and the blood clots so readily as to make it difficult to freely bleed the patient. This condition of the vascular system, produces many characteristic symptoms such as nephritis, jaundice, blindness, headache, edema of the lungs, infarcts in the placenta, convulsions, and death of the fetus and mother. The unknown toxins circulating in the blood are apparently influenced in their actions by the condition of the various avenues of elimination. It is a frequent clinical observation to see them suddenly cause convulsions and death when the skin, or the lungs, or the bowels, or the kidneys functionate poorly.

Eclampsia is a very confusing term for a condition much confounded. The prognosis like the etiology is shrouded in mystery to such an extent that reports based on statistics are viewed with suspicion. Reports from equally good observers vary from 3.3 per cent. to 50 per cent. for the maternal mortality. It is necessary to consider not only the method of treatment used, but also the

\* Read before the San Francisco County Medical Society.

character of the disease treated in order to account for the varying mortality statistics.

As long ago as 1668 Francois Mauriceau(3) in his book "*Des Maladies des Femmes*" advised immediate delivery by version for all cases of labor complicated with hemorrhage or convulsions. He also advocated venesection as well as removal of "small portions of the after-birth and membranes" to cause the convulsions to cease. Hugh Chamberlin(4), commenting in 1697 on the above advice naively says, "the author, you see was only a surgeon." Chamberlin recommended that he and his family possessed a far better secret method (forceps) whereby the child could be easily delivered.

In 1771 Manning(5) stated that with opium the convulsions could be best controlled. The discovery of chloroform in 1831 and the writings of J. Y. Simpson(6) urging the use of chloroform in obstetrics, led to one of the greatest contributions for the control of the convulsions of eclampsia. Shortly after this in 1869, Liebreich(7) described chloral hydrate, and in 1871 Fearn(8) in America called attention to the great value of veratrum. G. Veit(9) in Bonn obtained in 1887 the lowest maternal mortality rate ever reported (3.3 per cent.) by giving the patients large doses of morphine (0.03 gram) every forty-five minutes until the patient was deeply under the influence of the drug.

Some years before this in 1878 Halbertsma(10) suggested Cesarean section as a procedure that might possibly lower the high fetal mortality of 50 per cent., and some years later in 1892 Dührssen(11) devised his well-known operation for opening the cervix by a cutting operation to replace the more dangerous procedure known as accouchement forcé.

In 1900 a Russian, Stroganoff(12), published what is probably the most important contribution on the subject of the management of eclampsia that has appeared since Veit reported his success with morphine. Stroganoff reports 126 cases of eclampsia treated conservatively with a maternal mortality of approximately 6 per cent. and reports fifty-eight consecutive cases without a death. His reported fetal death rate for the same series is only 13.5 per cent.

The fact that he reports treating ninety-five cases of eclampsia in his clinic over a period of nineteen months, from May 5, 1905, to Dec. 3, 1907(13), makes one wonder if he has not included in his reports some cases of præclamptic toxemia. There are usually at least 100 confinements in hospital work for each case of eclampsia and some large clinics have as many as 150 or 200 confinements

for each patient with convulsions. According to this estimate Stroganoff's clinic must run from 500 to 1000 deliveries per month.

Stroganoff does not resort to operations except to meet some obstetrical difficulty not dependent upon the convulsions. He places the patient in a quiet room, plugs the ears with cotton and induces anesthesia with chloroform before resorting even to examination of the patient. He carries out the usual eliminative treatment but always with light anesthesia. If the patient does not pass spontaneously into labor, he does not operate unless the condition of toxemia is fulminating in character.

The following is his routine drug treatment:

		Grams
	a. morphia muriate.....	0.015
In 1 hr.....	b. chloral hydrate.....	2.0
In 2 hr.....	c. morphia muriate.....	0.015
In 4 hr.....	d. chloral hydrate.....	2.0
In 6 hr.....	e. chloral hydrate.....	1.5
In 8 hr.....	f. chloral hydrate.....	1.5

This is the usual treatment covering a period of twenty-one hours, which is expected to cure the patient—a cure consisting in a cessation of convulsions for a period of twelve hours.

That Stroganoff resorts to operative procedures in cases where treatment under chloral hydrate is not followed by improvement, is evident from a study of his list of fatalities. In this list all the usual operative procedures from Cesarean section to version and extraction are recorded. It is, therefore, probable that in many cases that recover, either spontaneous labor takes place or is induced by the attendant. Stroganoff makes claim to the fact, however, that under his treatment convulsions are controlled and at times labor does not take place until some time later.

The experience of Zweifel<sup>(14)</sup> is fairly characteristic of the claims made for the immediate emptying of the uterus. Zweifel had under expectant treatment a maternal mortality until 1892 of 32.6 per cent. Upon resorting to immediate delivery by means of the vaginal Cesarean section, he reduced his mortality to 15 per cent. Returning in 1901 to a more conservative treatment with less active surgical intervention, his mortality rate returned to 23.5 per cent. Finally, with eighty-five cases operated immediately upon entrance to the clinic, he lost only two mothers or a mortality rate similar to Stroganoff's of 6 per cent.

Lichtenstein<sup>(15)</sup> has reported fifty-three cases from the literature that have been treated by bleeding alone in which there was a mater-



nal mortality of only 10 per cent. Next to Stroganoff, Lichtenstein is the best known advocate of the morphine, chloral, chloroform treatment. However, he believes with many others that the general results can be bettered by combining with the Stroganoff method active bleeding(19).

The management of eclampsia will naturally vary somewhat according to the effect of the various methods upon the life of the child. The convulsion may occur before the child is viable, after the child is dead, or after the child is born. Or a convulsion may occur in pregnancy or in the first or second stage of labor with a child able to live if promptly delivered. Active treatment may endanger the life of the child, depending upon the experience of the operator, the place of operation or the choice of operation. If the child is born sufficiently under the influence of drugs as to poison the respiratory center, its life will probably be sacrificed due to too hasty delivery.

G. Winter in a recent article(16), reported for his clinic a fetal mortality of 42.8 per cent. following both active and conservative treatment. Peterson(17), reviewing the reports of 500 cases of eclampsia treated by Cesarean section, estimated that since 1908 the fetal mortality had been 10.6 per cent. However, he eliminated all the babies reported as dead before the operation started, all the babies under 2000 grams weight, and all the babies who died after the first few days in the hospital. The maternal mortality for the same series was 34.8 per cent.

With the same basis for estimating his statistics he reports a fetal mortality of 21.2 per cent. and a maternal mortality of 23.4 per cent., following delivery in 500 cases of eclampsia by the so-called vaginal Cesarean section(18).

Stroganoff(13) and Lichtenstein(15) report the fetal death rate under morphine and chloral as varying from  $13\frac{1}{2}$  to 25 per cent.

Whether treated by narcotics, by operation or by both procedures, the patient is always encouraged to eliminate by the skin, by the kidneys, and by the bowels, and is usually given large amounts of fluid by mouth, by rectum, subcutaneously or intravenously, of either plain tap water, or normal salt solution or Ringer's solution or soda bicarbonate solution, or magnesium sulphate solution or hypertonic salt solution, according to the theoretical ideas of the attendant.

Absolute rules cannot be made for the individual patient with eclampsia but general principles can be applied. In practice one's experience with eclampsia is so limited, if proper attention is paid

to prophylaxis, that when confronted suddenly with the problem one is apt to resort too quickly to irritating procedures in the desire to remove the fetus, or to delay active interference to such a time that the procedure becomes a farce. The work of Stroganoff demonstrates the importance of quieting the nervous system of the eclamptic, the work of Lichtenstein shows the value of bleeding particularly in cases of postpartum eclampsia, and the work of Dührssen points to probably the best way for the man who is surgically trained to quickly deliver the baby when that procedure is needed.

In private practice my experience over a period of fifteen years has been limited to a single patient developing convulsions while under my care. More than 20 per cent. of patients have shown symptoms distinctive of either chronic nephritis or of the so-called preëclamptic toxemia. They have escaped eclampsia without adding to the child mortality, I believe, by frequently consenting to the induction of labor when the symptoms of the preëclamptic condition do not improve under treatment or when the patient is in the last month of pregnancy.

The eclamptic patient was a thirty-two-year-old primipara with a twin pregnancy and hydramnios who suffered with symptoms of preëclamptic toxemia. As she had been married several years and was very desirous of a child, she refused the induction of labor. However, she went into labor spontaneously at the thirty-eighth week and had nearly thirty-eight hours of weak, irregular pains, refusing to have a Voorhees bag inserted to shorten her first stage. She then had a convulsion, was given a hypodermic of morphine and hyoscine and delivered by version. The first twin delivered had one convulsion just after birth and was deeply asphyxiated. Both twins and the mother recovered with practically no further antieclamptic treatment.

Of twenty patients treated for eclampsia in my clinic, or seen in consultation, eight were treated at home amidst poor surroundings and with meager assistance, with a maternal mortality (one was a Christian Scientist reader) of 50 per cent. and a fetal mortality of 37.5 per cent. Of twelve patients treated in the hospital apparently much more toxic than the first group, three died, one following treatment with morphine and chloral, one following vaginal Cesarean section, and one after abdominal Cesarean section because of associated placenta previa with the eclampsia.

This small group of cases is insufficient to draw definite conclusions, but in general from a study of the literature and from my own

experience I believe that by far the most important treatment for the convulsions of eclampsia, is the preventive treatment. It is possible to save patients from a condition which at least in general practice carries a high mortality, by the induction of labor before convulsions occur. The maternal mortality will be only slightly greater than with normal labor and if the child is viable will reduce the fetal mortality of eclampsia.

When convulsions occur, it is of primary importance to put patients deeply under the influence of morphine, chloral and ether, following which the labor should be terminated with the least possible shock to the patient, and all the avenues of elimination, including free bleeding, instituted. Throughout the course of the disease quiet should be insisted upon, which means in the hospital a specially arranged room with specially trained internes and nurses.

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CLAY AND WEBSTER STREETS.

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## A CASE OF POSTPARTUM ECLAMPSIA WITH AUTOPSY.\*

BY

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THE purpose of this paper is to put on record the findings at autopsy on a patient who died of eclampsia on the third day. We owe the privilege of reporting the case to Dr. B. C. Hirst.

Mrs. V., an adult female was delivered on February 9, 1916, of two living female children at 10.30 P. M. Both legs, the lower abdomen and especially the labia were edematous before delivery. Ether anesthesia was used during delivery. There was one large placenta with two cords, and no postpartem hemorrhage. On the tenth, the vision began to fail and at 5 P. M. violent clonic convulsions lasting about three minutes occurred. There were five convulsions at intervals of ten minutes. The blood pressure was lower after venesection. On the eleventh, the urine was decreased, with many casts, and boiled solid. On the twelfth, the patient was in a state of collapse, pulse rapid and weak, with epigastric pain, vomiting and death at 3.30 P. M.

The autopsy showed a well-nourished female, pallid but not jaundiced, with lactating breasts, and edema of the lower extremities and vulva, especially marked in the latter region. The abdomen

\* From the McManes Laboratory of Pathology of the University of Pennsylvania. Presented before the Pathological Society of Philadelphia.

was slightly distended and the cavity contained several hundred cubic centimeters of a yellow serous fluid with flaky lymph.

The liver weighed 1150 grams, was neither enlarged nor decreased and was firm. Petechial hemorrhages were present under the capsule. There was apparently some perilobular fibrosis. Red blotchy areas were present in the left lobe and grossly it was especially noted that the organ did not resemble the picture of eclampsia. This was due to our unfamiliarity with the early state.

Microscopically the liver picture is quite distinct. The petechial capsular points are seen to be small areas of coagulation necrosis with the infiltration of blood pigment. The blotchy red areas are irregular foci of cellular necrosis and are quite extensive in their involvement. The cells not included in the necroses are granular and are either swollen or compressed. The smaller capillaries are distended so that the intercolumnar spaces are wide and contain transudate plasma, red blood cells and the detritus of desquamated cells.

The kidneys present a picture of tubular degeneration associated with glomerulo-proliferative and interstitial productive changes. The adrenals are the seat of extensive hemorrhages with degenerative changes. The spleen shows an acute reaction with an extensive amount of hemorrhage and edema but without cellular proliferation in the pulp. A tentative diagnosis of syphilis is made upon the finding of rather extensive aortic and arteriocapillary fibroses in such a young individual. The heart shows a moderate hypertrophy as a result of the arterial changes and distinct degenerations, cloudy and fatty, of the musculature. The lungs aside from the terminal congestion and edema show an organizing pneumonitis as the result of an old pneumonia.

The intestine presents decided catarrhal and follicular changes. The mucosa and submucosa of the colon, grossly bronzed, have a number of well-defined large phagocytic cells filled with a yellow diffuse pigment. It is presumed in this case, although it did not give the iron reaction, that this pigment is hemosiderin. This may be the result of hemolysis or, on the other hand, the result of an old pigment of autochthonous nature.

The uterus presents the usual picture of an early puerperal type without infection and with the endometrium containing bits of retained placenta. It is noted that some of the chorionic cells penetrate pretty far into the myometrium.

No attempt is made in the paper to go into the etiological factors but to bring out the important morphological changes which seemed to have a direct bearing and in this way suggest avenues for future study. The necrotic changes in the liver and the hemorrhages into the adrenal are especially striking.

In a summary of the case the following points stand out. A young woman apparently healthy, aside from the possibility of syphilis with early arteriocardiorenal changes, gave birth to normal twins.

She developed a toxemia almost immediately and died in sixty-five hours. Whatever might have been the stimulating factor, the liver above all else was involved with extensive vascular, degenerative and necrotic changes. The heart and kidney have probably suffered degenerative faults secondarily. The kidney may have been involved and was to some extent previously but in comparison to the severity of the liver was not in this case at least the important factor. Hemorrhages into the adrenal and transudation from the peritoneum with hemolysis accompanied by early splenic reaction complete the picture.

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## INDICATIONS AND CONTRAINDICATIONS FOR CESAREAN SECTION.\*

BY

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THE large increase in the number of Cesarean sections being done during the past five years throughout the country very properly brings before us the consideration as to whether the frequency of this operation is justified or not, and a statement of its indications and contraindications.

The ease and safety with which it can be performed, if the ordinary rules of modern surgery are followed, has tended to make it popular both among the profession and among women. The short time it takes for its performance, the absence of shock, of lacerations and injuries to the mother's soft parts, no injuries to the baby's head, and no birth palsies, make a decided appeal to the physician; while the relief from the suffering of a long or dangerous labor appeals even more strongly to the mother. If this could be done always with perfect safety to the mother and with a certainty of no bad effects in subsequent labors, we would indeed have arrived at an obstetrical millennium.

We all realize, however, that we have not as yet arrived at such a millennium; and the reason is that there is still a definite morbidity and mortality to any laparotomy, no matter how skillful the operator or how favorable the surroundings.

With the small scar high up on the abdomen there is now no danger of postoperative hernia, but we cannot observe the healing of the uterine incision or judge its reliability when put to the strain of the

\* Read before the Buffalo Academy of Medicine, Dec. 13, 1916.

next labor. We still see an occasional death from peritonitis in cases that supposedly have not been infected, though this fortunately is rare.

Therefore, in considering the mode of delivery of our prospective mothers, we must consider not only the immediate morbidity and mortality, small as it is, but the possibility of rupture of the uterine scar under strain. Bearing these dangers in mind, there is a small but definite group of cases which can be delivered more safely by abdominal section than by the natural passage, and in my opinion, it is only by adhering closely to the more or less definite indications rather than operating on all possible cases, that we can keep this valuable operation from falling into disrepute.

I will not go into the history of Cesarean section except to recall to you the statement made in the early eighties that "the mortality of Cesarean section when performed by American bulls was lower than that by American surgeons" and to point out that its safety has increased with the application of asepsis and the small high modern incision, as well as the delivery of the child without bringing the uterus outside of the abdominal cavity.

In looking over the recent literature on the subject, I find a very large number of conditions given as the reason for operating; among these being:

- Absolutely contracted pelvis.

- Contracted pelvis (border-line cases).

- Disproportion between fetus and pelvis.

- Contracted outlet in funnel pelvis.

- Habitual fetal death in labor.

- Prolapsed cord.

- Tumors obstructing birth canal.

- Stenosis of cervix from scar tissue or cancer.

- Eclampsia, preeclamptic toxemia.

- Placenta previa.

- Concealed hemorrhage from separation of normally implanted placenta.

- Cardiac decompensation with complications.

- Edema of vulva.

- Face, brow, occiputposterior, and transverse presentations.

- Mother nervously unfit.

In this long list there are a few very definite indications, a number of allowable indications, more of very hazy indications and some that are indefensible.

I will take these up separately but briefly.

*Absolutely Contracted Pelvis.*—About this condition there is little argument and Williams states that “a true conjugate of less than 7.5 cm. renders the spontaneous birth of an ordinary full term baby impossible, though it is possible after a craniotomy.”

*Contracted Pelvis (Border-line Cases).*—These would be the cases with a true conjugate above 7.5 cm., and here the obstetrical judgment and individual preference of the attendant comes into play. With some who are also gynecologists or do considerable obstetrical surgery, their mind may be more or less biased by their knowledge of what can be safely accomplished by surgical means. Others who do no surgical work at all, but who have attained a high degree of skill in delivering difficult cases by forceps or version are naturally prejudiced in favor of this method of procedure. To my mind, the course to follow in this class of cases is to weigh the evidence of our findings pro and con, and to decide by what shows to the greater advantage and safety of mother and child.

This evidence consists of careful and painstaking pelvic measurements, position and presentation, size of child and ability to engage the presenting part; if a vertex, the amount of flexion and compressibility of the head.

Our obstetrical judgment based on these findings can only be of value if built on careful observation of the delivery of a large number of such cases. For how often we see a case in which we had feared a difficult labor, go through with no trouble, or at the most a low application of forceps. A few cases have been reported of women delivering themselves spontaneously while being prepared for Cesarean. These were probably cases in which the pelvic measurements might have forecast trouble, but in which the attendant had not taken into consideration the size of the child or the compressibility of its head.

The estimation of the size of a child at term is of greatest importance, and while it can never be anything but relative, one can by an antepartum estimate in every case he sees come to a fair degree of skill.

There is no argument here as to the possibility of Cesarean section, for we know that we probably will get both a living mother and child. But at the same time we must consider the maternal morbidity and mortality, small as it is, and also the effect of the operation on subsequent labors. This I will take up later.

On the side of delivery through the birth canal we must consider not only the possibility of delivering a living unmutilated child through undamaged soft parts, but we have to realize the possibility



of cerebral injury and of nerve lesions due to difficult forceps or version. Too often we see in our own, or in the practice of others, stillborn babies, mental defects from brain injury, fractured humerus or clavicle, or birth palsies, all due to a mistake in our judgment.

It is poor obstetrics to do a Cesarean because we have the opportunity, because it is easy and simple, or because we can persuade ourselves or the patient that it is permissible on account of a slightly contracted pelvis; but it is also poor obstetrics to drag a child through a small pelvis by forceps or version simply to demonstrate our ability to do it. As someone has said, "It is possible to go through the Niagara whirlpool in a barrel, but not advisable." These border-line cases should be decided by trying to put aside our personal preference or prejudice and deciding what is for the best interest of the mother and next for that of the baby.

If we cannot come to a definite decision, I consider it permissible to allow the test of labor for a limited number of hours hoping that the head will engage. This can be done safely by avoiding vaginal examinations (with the exception of one to estimate the conjugate vera) and obtaining our information of progress from abdominal findings.

If then we find the head unable to engage after molding we can operate; while if the head does engage we can let labor proceed, and we have saved the patient an unnecessary surgical operation.

*Disproportion Between Fetus and Pelvis.*—Here we have practically the same problem to meet as in relatively contracted pelvis. Occasionally these very large babies are overtime and any woman who goes past her expected date of confinement should be seen frequently and the size of the baby estimated carefully. If the baby seems to be above the average size or as large as would seem safe for the given pelvis, labor should be brought on.

*Contracted Outlet.*—The funnel type of pelvis is more common than is generally supposed, and many of the women who give a history of low forceps in their labors belong to this type. Fortunately we do not see many of the badly contracted outlets. They may cause serious trouble in delivery, however, and if the distance between the tubera ischii measures less than 8 cm. the anterior and posterior sagittal should be estimated. If the posterior sagittal falls short it is better to do a Cesarean than to subject the baby to the danger of cerebral hemorrhage from a difficult forceps extraction. As has been aptly pointed out, "It is sometimes easy to get a head into a pelvis but difficult to get it out."

*Habitual Fetal Death in Labor.*—We should do our best in these cases to determine the cause of the previous deaths, by Wassermann reaction, careful exploration of the pelvic cavity, etc.

If we are unable to ascertain the cause and are, therefore, unable to correct it, I feel that these women are entitled to Cesarean section to obtain a living child.

*Tumors Obstructing Birth Canal.*—Tumors obstructing the birth canal form a more or less definite indication for section. These may be uterine fibroids, or the various solid or semisolid ovarian tumors; but as they often become gangrenous from labor pressure or torsion of the pedicle, it is safer for the mother not to subject her to the risk of labor. In this instance the low or median incision should be used and the tumor removed after the uterus is closed. Nonpedunculated uterine fibroids should be removed before pregnancy or fairly early in it, but at term they are not a cause for Cesarean unless obstructing the canal and could be removed between pregnancies if thought best. A pedunculated tumor may be a cause for section for fear of torsion, whether obstructing the canal or not.

*Prolapsed Cord.*—This complication in a multipara should practically never be the cause for section. In nearly every case the cervix could be dilated by bag, or manually, rapidly enough to permit the delivery of a living child by version. In a primipara with rigid cervix it may be justifiable, but here it is entirely in the interest of the child, and the case should be stated clearly to the parents, leaving the decision with them.

*Placenta Previa.*—To make a statement positively that placenta previa should or should not be treated by Cesarean section is irrational. There are so many factors differing in different cases that the treatment of the one in hand would have to be decided on what presented in that particular instance.

No one would agree that all placenta previa should be treated by section; and certainly no one should say that no placenta previas should be so treated. The ordinary classification of placenta previa is that of marginal, or only a slight encroachment on the cervix. Partial, or the os partly covered by placental tissue. Complete, the os completely covered. Central, the os not only completely covered, but near the center of the placenta.

The marginal or partial varieties usually cause us but little anxiety or trouble, and often as simple an expedient as rupturing the membranes and allowing the head to come down on the detached area will arrest the bleeding. If this does not accomplish it a De Ribes

or Voorhees hydrostatic bag will almost certainly do the work, and at the same time give us the much desired dilatation for delivery.

A complete placenta previa is a much more serious affair and often taxes the skill of the accoucher to the utmost.

Here the treatment would depend on the dilatability of the cervix, the amount of placental tissue involved, the amount of blood lost by the patient, etc. If the cervix were soft and the edge of the placenta near enough the os to allow us to push it to one side, we could use a rubber dilating bag, or do a version and extraction. If the cervix were rigid, the hemorrhage considerable, or the edge of the placenta out of reach of our finger, we would get better results for both mother and child by a Cesarean.

A central implantation I consider to be an absolute indication for Cesarean except under unusual circumstances. This would apply more particularly to primipara with rigid cervix.

In the less serious conditions the best results will be obtained for both mother and child by the use of the rubber bag rather than the more popular version. For version, while giving as favorable a maternal mortality as the bag causes the death of most infants, unless it can be followed by rapid extraction.

Cesarean section, if used in central implantation and in some of the complete variety, will give a much lower mortality than if we use other treatment and allow our patients to become exsanguinated during the slower delivery. Whatever treatment is chosen the fetal mortality will always be considerable as many of the infants are premature or weak from loss of blood.

*Concealed Hemorrhage from Separation of Normally Implanted Placenta.*—Most of these we see are not especially serious and may safely be treated as we would treat a mild degree of placenta previa, by dilating the cervix with a hydrostatic bag. Williams and Couvelaire have reported a number of the extremely dangerous type in which the body of the uterus has undergone degeneration and refuses to contract. This type must be kept in mind in these cases and a section should be done, followed by a hysterectomy.

*Eclampsia.*—There have been many theories advanced as to the cause of this serious complication of pregnancy, and as many methods of treatment. Two of the most rational theories are: First—an excess of cytotoxin (a protein poison originating from the fetus) circulating in the maternal blood and which is not neutralized by sufficient cytolsin of maternal origin. The other theory is that it is an excess of the products of maternal and fetal metabolism which the kidneys and liver cannot dispose of. Per-

sonally I am inclined to believe that the theory of a protein poison is the nearest right. Dr. Victor Vaughn of Ann Arbor has shown that meats contain a protein poison, and that ordinarily it does no harm as a food as the body has developed certain defenses to counteract it. Among these defenses are the ductless glands. He has shown that if you remove the thyroids from sheep or goats, they, being herbivorous animals, are not affected; but if you remove the thyroids from dogs, though they will live for a considerable time on bread and milk, they will die in convulsions in a few hours if fed on meat.

What the real cause is we do not know, except that it is a toxemia in which the kidneys and liver are the chief organs to sustain damage. It sounds reasonable enough to say that to relieve the woman of the pregnancy which is causing the toxemia will cure the disease; but unhappily this is not borne out by actual experience.

Up to ten years ago the treatment consisted mostly of a large amount of chloroform given with each convulsion, and as this only hastened the breaking down of liver cells in an already damaged organ, the mortality ran over 50 per cent.

Then came the treatment of elimination by the bowels, skin and kidneys with a reduction of mortality to about 30 per cent. To-day there are two plans of treatment. First, immediate delivery by abdominal or vaginal Cesarean section; and second, that of elimination combined with either veratrum viride or morphine.

The party advocating immediate delivery by section is led in this country by Peterson of Ann Arbor and McPherson of New York. The party advocating medical treatment is led by Zinke of Cincinnati, Tweedy of Dublin, and Stroganoff of Russia; and I will quote statistics to explain my position in this question.

In Peterson's paper "Abdominal Cesarean Section in Eclampsia" he reports 500 cases delivered by section in which 174 died, a mortality of 34.8 per cent. He also reviews 283 cases delivered by many different operators with seventy-three deaths, a mortality of 25.7 per cent.

His first table shows a mortality of 15.9 per cent. after prompt delivery in 615 cases.

Dr. A. B. Davis of New York reports thirteen cases of eclampsia which he delivered by Cesarean in which four died, a mortality of 30.7 per cent.

Kellitz, who collected twenty-eight cases of Cesarean section for eclampsia, with a maternal mortality of 50 per cent. and a fetal of 62 per cent.

On the other hand, Stroganoff has personally treated 360 cases with a maternal mortality of 6.6 per cent. and a fetal mortality of 21.6 per cent. Six hundred cases have been treated in Russia according to his method, with a maternal mortality of 8 per cent. and a fetal mortality of 21 per cent. Sixty-one cases have been treated in Germany in the same way with a maternal mortality of 6.5 per cent. and a fetal mortality of 18 per cent. Tweedy of Dublin reports a mortality of 9 per cent. Zinke of Cincinnati reports a maternal mortality of 13.3 per cent. and a fetal mortality of 46.6 per cent. under elimination plus *veratrum viride*. Our maternal mortality at the Buffalo General Hospital since using the *veratrum* and elimination treatment has dropped from 50 per cent. to 12 per cent.

It is a mistake to suppose that the Dublin and Stroganoff treatment consists mostly of large doses of morphine, and to correct such an impression I will quote the cardinal principles of these treatments, which are very similar.

1. Deliver when possible only. *Accouchement forcé* is not advocated in any form.
2. Limit metabolism and avoid further metabolism. This is done by starvation, morphine, and gastric lavage.
3. Aid excretion. Purging and repeated high irrigation of the bowels. Sweating is not used. Subcutaneous injection of soda bicarbonate solution. Saline is not used as it is not eliminated well in kidney disease and it leads to locking up of fluid in the more solid tissues.
4. Treatment of special signs, such as respiratory weakness, cardiac weakness, etc. Morphine is only used to control convulsions.

Vaughn has made a great many experiments in injecting egg white into the ear of a rabbit and finding it in the alimentary canal, and he says that there is no question but what the protein poisons and various other poisons are eliminated by the alimentary canal. These experiments of Vaughn's give us a very rational explanation of the brilliant success of Stroganoff's and Tweedy's treatment of eclampsia, the main feature of which consists of gastric lavage and repeated colonic irrigation.

The answer to this perplexing question of the treatment of eclampsia will probably come to us from the physiological laboratory rather than from the operating room.

The great difference in the maternal mortality between surgical and medical treatment is most striking; but grant for the sake of argument that they are equal, which they are far from being. Even

if they were equal in results, the medical treatment leaves the mothers surviving the disease in the same physical condition, while a Cesarean section leaves a uterine scar of uncertain strength in subsequent labors.

Zinke says, "He who denies the efficacy of medicine in the treatment of eclampsia betrays a lack of knowledge and experience in which a competent surgeon should not be wanting."

A primipara with undilated cervix is more entitled to section than a multipara, for here the mother could be delivered with comparative rapidity by dilating the cervix manually or by hydrostatic bag.

I am not arguing that Cesarean section should never be used in eclampsia, but rather that it should be used only in those cases that do not respond to medical treatment, or where there is some other complication, as contracted pelvis, that would prolong pelvic delivery.

*Cardiac Decompensation.*—There need rarely be any great anxiety of a woman's safety during delivery on account of a valvular lesion unless she has lost compensation. In the face of this condition, we are often anxious and rightly so, for any prolonged muscular exertion or pain may bring serious results either immediate or remote.

One great aid in lessening the strain and physical suffering and in adding to our patient's safety is the use of morphine and scopolamine during the first stage. This with other aids, such as dilatation of the cervix, forceps, or version, in favorable cases will carry many to a favorable conclusion. Mackenzie gives a poor prognosis with mitral stenosis or aortic regurgitation.

There will still remain a small number of cases with decompensation where none of these maneuvers will give us a sufficient margin of safety. Among these would be the primipara with rigid cervixes or some complication, such as malpresentation or disproportion between fetus and pelvis, and here I feel that we are justified in delivering quickly by abdominal section under gas-oxygen anesthetic, or in very extreme cases under local anesthesia.

The remainder of indications listed earlier I shall group together as "Indefensible Indications for Cesarean Section." These are: edema of the vulva; face, brow, occiput posterior, and transverse presentations, and mother nervously unfit.

Edema of the vulva can practically always be reduced by purging and diet, or by multiple puncture. The different malpositions such as face, brow, occiput posterior, and transverse should be amenable to skillful obstetric manipulation blended with patience.

The reason that a mother is nervously unfit to undergo labor seems

to me to be a far cry. Personally, I should be inclined to carry such a case through labor with the help of morphine and scopolamine, or some other sedative.

In taking up the danger of rupture of Cesarean scar, I can do no better than to quote the conclusion of Dr. Palmer Findley of Omaha, Nebraska, who has analyzed sixty-three reported cases. There are many able men who abide by the dictum "Once a Cesarean always a Cesarean," but many of us have seen cases delivered by the natural passages, following a Cesarean, and Findley's opinion based on so large a series should bear great weight.

He says: "When Cesarean section has been followed by a fever course, the uterine wound should be regarded as insecure in event of a subsequent pregnancy and should call for a repeated section at the onset of labor. A perfectly healed Cesarean wound may be relied on to resist the forces of labor, but in view of the fact that the integrity of the wound is an unknown factor in all cases, we are constrained to exercise the utmost caution and calling for masterly control in the conduct of every case in pregnancy and labor following Cesarean section. The liability of rupture is a real danger and should stand as an argument against the increasing tendency to widen the scope of elective Cesarean operations."

Dr. Rudolph Holmes in expressing his views of the increasing frequency of Cesarean section has written an article entitled "Obstetrics, a Lost Art," and while I feel that this is an extreme view to hold, it might well be justified if the present furor for Cesarean section continues to grow.

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## GONORRHEA SOCIOLOGICALLY CONSIDERED.\*

BY

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THE sociological treatment of venereal diseases, may like the medical, be carried out under two methods of procedure, (a) therapeutic, and (b) prophylactic. The first plan is the one that is most frequently adopted, for the second, which is the more ideal, cannot as yet and probably will not for generations to come be achieved. We shall, therefore, concern ourselves for the present with a consideration of the most feasible means at our command which, if adequately employed, may minimize the ravages of gonorrhea and syphilis.

To approach this discussion broad-mindedly, without attempting to hide our weaknesses behind equivocation and subterfuges, we must admit, first of all, that "life" with its various complexities and ramifications, revolves around the "sex problem." In fact, the three great human institutions—religion, law, and ethics—which govern man's activities since antiquity, have been conceived and founded upon the standards of sexual relations, that have prevailed in different orders of society, from time to time. This law of attraction of the opposite sexes, sends its roots to the very bottom of creation, it permeates the entire universe, its laws are basic and its force irresistible.

Sexual affinity is, therefore, a natural and healthy phenomenon

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exhibited by all living matter. In the lower animals its purpose is chiefly procreative, while in the higher it is also pleasurable. Education may erect barriers to divest sexual relations of its aboriginal proclivities, religion may invoke all the aids at its command to lead the erring on the right path, and legislators may promulgate the most stringent laws to punish the transgressors of the seventh commandment, yet illicit sexual intercourse will continue to exist under our present social and economic system. All that we may expect to accomplish through our social efforts is to modify its banefulness and ameliorate its evil consequences.

In the remote past, man has satisfied his sexual appetite unhindered. Gradually, with the advance of civilization, promiscuity and incest have been replaced by polygamy. The first "wife trust" recorded in history is that of Solomon. This institution still survives in the Orient, and the size of one's harem is determined by the same factors that regulate the number of Bethlehem steel shares one may own, namely, the factor of wealth. In our own country we witness Mormonism, which is a religious subterfuge for the continuation of polygamous sexual life, which has always been the characteristic of the male, under all conditions and climes. Fortunately for civilization, normal woman is always monandrous, and it is only the sexually depraved, the nymphomaniac, that is polyandrous. According to most authorities, this difference in the sexual temperament has a physiologic basis, the menstrual phenomenon in the female being supposed to represent the assuagement of pent-up sexual desires, which occurs periodically, while the male is not provided with similar safety valves. Clinically and zoologically this explanation is not substantiated; most women are sexually passionate immediately before, but most often, after menstruation, and in the lower animals, the female allows the approach of the male only during the rut. I am rather inclined to believe that environment, civilization, and the difference in the consequences of sexual relations, are the potent factors which contribute to the female's monandrous characteristics. The structural differences in the sexes, with the consequent rôles each has to play after conjugation, has so molded our sociological conception of sexual morality that society has adopted a double standard to suit the sexes.

So that to-day, the majority of us tolerate, and some even encourage the "sowing of wild oats" in the male, but condemn most relentlessly the same transgression in the female. I cannot conceive of two kinds of honesty, of two kinds of virtue, and of two kinds of decency. For the moment we admit of a transgression in the female,

we must at the same time admit of a male accomplice. The aider and abettor in a crime are equally guilty. The only balm which society finds with which to heal its wounded sensibilities is by ostracizing the female offender, while offering in wedlock their immaculate virgins to the male culprits, without the least moral pang and totally blind to his past record.

Some social reformers are perhaps deploring this iniquity to women and suffragists may perhaps yearn for an equality of sex standards, but I hope that this equality will never be granted. For it would only tend to lower the woman and not to raise the man. Our present conception of the dignity of womanhood is high. For the sake of the loftiest ideals in us, let us maintain that standard, until man will rise to the same height.

With the advance in civilization polygamy has been abandoned and monogamy has taken its place. This has certainly had a salubrious effect upon the *morale* of society, but it has left in its wake another institution for the gratification of man's polygamous desires, "prostitution."

Prostitution is the product of civilization, in fact, it is one of its distinguishing characteristics, for primitive society was free from it. As soon as history began to record the events of human activities, prostitution looms up as one of its social functions. The Bible records its existence in unmistakable language, the story of Jehuda and Tamar serves as a concrete example. The light in which prostitution was considered, varied with different social orders. In Sparta and Greece the *puella publici* was treated with respect and consideration. In the temple of Corinth, religion made prostitution sacred, and women were set aside for the purpose. Mythology abounds in erotic symbolism which mankind has worshipped. In certain parts of the Orient it is to-day a religious rite. The appellation employed in the Bible, for a courtesan, was "*kdesho*" which means holy one. But why delve into moldy records for evidence, when more recent facts are at hand. Paris, the seat of culture, refinement and art, is at the same time the Mecca for the worshippers at the shrine of Venus. The Parisian prostitute has frequently played an important rôle in shaping the destinies of the Monarchy and later on of the Republic. The Parisian courtesan plies her calling discretely and there is nothing secretive about the attentions paid to her by her clientele. We Americans are not blameless but we lack the boldness and open-mindedness of the Frenchman, who acknowledges the existing sexual depravities, and tries to mitigate its damaging effects. The sooner, however, we tear off the mask of hypocrisy

which dims our vision, and recognize that prostitution is not a theory, but a fact, that it is the result of our social and economic systems, and that while we may not eradicate or suppress prostitution completely, we may, nevertheless, save many of the victims that fall as its prey; the sooner society recognizes this fact, the quicker will it be the gainer.

We must admit then that prostitution is the child of our own creation, and discern clearly all its defects, manifested in paresis, locomotor ataxia, cerebral hemorrhages, blindness, salpingitis, ovaritis, peritonitis, relative and absolute sterility, with all its accompanying tragedies. We must recognize the great loss in national efficiency it causes, and the monetary burden the community has to carry, in order to maintain the insane, the tabetics, the blind, and the rest of the vast army of physical and moral defectives, who are all the victims of promiscuity, and mindful also of the debt we owe to future generations; it behooves us, to treat this question with the concern that would activate us in the treatment of defects in our own offspring. The methods to be employed are not indifference, ridicule, ostracism and neglect, but intensive studies of these defects, intensive care in their correction, executed with kindness, supervised with intelligence, and treated with the most efficient medical means.

What are the measures adopted by sociologists for curbing the evils of prostitution? The most potent remedy, which has been employed for a long time abroad, and which was also advocated for adoption in this country, was "segregation." For a time it seemed that this method was the most efficient. It was expected that through its adoption, the traffic in lust would be limited to certain districts, and thereby not only remove this glaring vice from offending the sensibilities of the innocent and the virtuous, but that it will also tend to diminish the spread of venereal disease, by the exercise of medical supervision over the female offenders. Theoretically, these measures appeared to be sound, but their practical application resulted in a dismal failure. Americans were wise in not following their European brethren in this respect, for segregation is a myth. In Hamburg the brothels are scattered in eight different parts of the city and in Dresden they invade forty-eight streets. This condition prevails in all large cities where houses of prostitution are tolerated. The inability to concentrate the prostitutes, makes it also impossible to control them medically, for they fail to register. Paris with 60,000 prostitutes, registers only 6000, Berlin with 30,000 prostitutes, registers only 3300, Brussels with 3000 prostitutes registers 182.

These figures certainly prove the futility of segregation and registration, and Denmark was among the first countries to relinquish this well-intentioned reform. England, Holland, Switzerland, and Norway soon followed suit. All these countries became convinced that their previous measures were inefficient and have substituted instead, sufficient medical care, given gratuitously and readily to the venereal patients. It is sad, indeed, that New York with a population rapidly approaching the six million mark, has set aside for the treatment of venereal disease 297 beds, among which are included gynecological and urological cases, while Copenhagen with a population of 500,000 has 240 beds reserved for this purpose.

For the present, there is no stronger weapon in our hands, with which to combat the scourge of venereal diseases than by a provision of sufficient beds for this class of patients. It is the sacred duty of every well-intentioned sociologist to bend all his efforts and procure sufficient state and city funds for this purpose, and not allow the venereal patient to beg for admission to a hospital and find himself turned away with scorn and disdain, especially from sectarian hospitals. The slogan that "every cured patient must be regarded as another extinct source of infection" ought to be sounded repeatedly, until our responsibilities to the unfortunate gonorrheic or syphilitic are fully aroused, and until a bed is provided for every victim that applies for medical help and advice. This is to my mind the ideal form of segregation, free from the corruption of the police and the moral chastisements of the divine representatives on earth.

Sufficient hospital accommodations, offered to these patients in a humane spirit, would attract them, especially if these patients would be known in the hospital by number only, and the nature of their malady to remain a medical secret, subject to no lay investigations. Measures of this nature, I am sure would induce the professional habitue to seek medical help, for it will spare her the harsh treatment of the police intermediators, and what is most important remove the stigma of her vocation when she will come of her own accord. For the most degraded harlot has some sensibilities left, and we ought to spare them.

These means then would reach the professional prostitute, but how about the clandestine type of female offender? This army of sexually lax individuals are recruited from the shops, the department stores, the offices and the stage. The majority of them are more intelligent than their more unfortunate sisters that walk the streets. Either as a result of sexual excitement induced by frequent and close association with male co-workers in their daily occupations, or

as a result of insufficient earnings which bars them from enjoying the bounties of nature in a small measure at least; as a result of either of these causes they yield to temptation and pursue an illicit sexual life. The consequence of this moral breakdown in this class of women has a twofold result. Those who are of a stronger will, practise illicit sexual relations, as a matter of necessity for a time only, and at the proper opportunity take their honorable place in society. The weaker ones, who cannot cover their trails as successfully, usually end by joining the army of the professional prostitutes, and society is to blame for it. For we must not forget that the very pew holder who has brought his female victim to the brink of degradation, is the very first one to hurl her over the precipice into the abyss of eternal shame and ruin. We pluck the flowers and then step on them.

As a source of spreading venereal diseases, the clandestine type is by far the more dangerous one. For being more secretive in her sexual relations than the professional one, she fears to seek medical advice, and very often is totally ignorant of being sick. The only time these females will consent to consult a physician is when there is a physiological amenorrhea. This type of patient will not come to our venereal clinics and the best means of reaching them is through educational methods.

The propaganda of social hygiene and moral prophylaxis has been instituted in many communities, and this movement ought to receive the hearty coöperation of educators, the church, and the moralists. To strike this evil at its very root, we ought to begin the teaching of sexual hygiene as soon as puberty is established, and much of the dire consequences witnessed by all of us would be eliminated.

Birth control is another prophylactic measure that would tend to curb the spread of venereal infections. It is regrettable that medical men cannot as yet rise above the sordid ways and means that govern society as a whole in the pursuit of its affairs. The trust magnate would spend fortunes in defeating a strike of his employees, causing thereby untold suffering, starvation, and death, under the pretext of "the sacred right of property," and at the same time give liberally to hospitals, and other social undertakings for the relief of the misery which he has created. The church pronounces exhortations against the interruption of pregnancy or the prevention of conception, on the ground that we have no right to interfere with divine judgment, but it remains inert in fathoming the real causes of prostitution, drunkenness and poverty, for fear

that it may undermine its own foundations, and tend to sever the links that connect it with its mainstay, wealth. And the medical man apes his fellow creatures in the consideration of medicosociological problems. Why always adopt double standards? Why rob Peter in order to give to Paul? Why practise birth control in your own family, or among your rich patients, and deprive the poor ones of this same valuable information and advice? They are really the ones who need it most. Why not make birth control legitimate so that the physician, who is by right of his education the proper source from which information of this character should come, should be able to give it to those entitled thereto, and not entrust this delicate sociological problem to unreliable persons, as it is done at present? Birth control would diminish venereal disease by increasing the number of legitimate early marriages. It would contribute to the happiness of many families, by easing the burden and responsibilities of the provider. It would tend to prolong the life of both parents, especially the mother, and also diminish infant mortality.

There are many more phases of this problem that could be entered into but lack of time prevents further elucidation. The point that deserves special emphasis is, that no matter what laws or measures we may adopt for remedying the spread of venereal disease, we must always bear in mind that these ills are deeply rooted in the weakness of human nature, and that, therefore, the laws framed for the control and prevention of venereal infections, should be framed by men of liberal education, of wide experience, and possessed of hearts that pulsate human kindness and sympathy.

In conclusion I wish to quote the summary of the British Royal Commission, presided over by Sir Thomas Barlow, in November, 1915, appointed for the purpose of diminishing the spread of venereal diseases:

1. To provide accurate and enlightened information as to the prevalence of venereal diseases, and as to the necessity of early treatment.
2. To promote the provision of greater facilities for their treatment.
3. To increase the opportunities of medical students and practitioners for the study of these diseases.
4. To encourage and assist in the dissemination of a sound knowledge of the physiological laws of life in order to raise the standard both of health and conduct.
5. To coöperate with existing associations organized for this purpose.

6. To institute courses of lectures and exhibits.
7. To promote such legislature, social and administrative reforms, as are relevant to the foregoing aims and objects.

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## A REVIEW OF 300 OBSTETRICAL CASES IN PRIVATE PRACTICE.\*

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A COMPARATIVELY small number of cases accurately observed, and carefully recorded, may be of more value to study than a much larger number of similar cases whose records, etc., are more or less incomplete. Again, where the records and observations are the work of one individual, they should be of much greater value than the average hospital statistics, which are the work of a large number of individuals, many of whom are assistants with comparatively little experience.

It is certain that in my own experience, the records of my private cases are more complete and the results better known than those of ward cases, a large proportion of whom disappear from view when they leave the hospital. I thought it might be of interest, therefore, to review my private obstetrical cases.

The number of obstetrical cases which I have had since coming to Washington have been a few over 300. Taking the last 300 cases, 190 have been *primiparæ* and 110 *multiparæ*. The much larger number of *primiparæ* can be partly accounted for by the fact that I confine my work to gynecology (in a broad sense) and obstetrics. With the first child, the woman is more apt to seek the aid of a specialist than with subsequent labors. The tendency among the better classes of society to limit the number of children had also its influence.

*Presentations.*—The presentation was noted in the first stage of labor 278 times and have been as tabulated on p. 799.

These proportions agree fairly well with the usual statistics, except that the occipitoposterior presentations show a relatively larger number than has been generally observed. I am convinced that my figures are more nearly correct than those usually given. Many

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cases which in the beginning of labor are of the occipitoposterior variety, rotate before the presentation is determined.

L.O.A.....	172 cases.....	62.0 per cent.
R.O.P.....	43 cases.....	16.0 per cent.
R.O.A.....	30 cases.....	11.0 per cent.
L.O.P.....	16 cases.....	6.0 per cent.
Breech.....	12 cases.....	4.3 per cent.
Transverse.....	4 cases.....	1.4 per cent.
Brow.....	1 case.....	0.3 per cent.

*Forceps.*—Forceps have been applied fifty-three times (17 per cent. of the cases). This seems a large proportion of instrumental labors. It can be explained in two ways, *i.e.*, first, by the large percentage of primiparæ and, second, by the considerable number of these cases which were seen in consultation. Two babies were lost, I think, by too long delay on my part in applying forceps, and so far as I can tell, I have caused no fetal deaths by the use of these instruments. I have had a few cases of transient facial paralysis, have caused a few small scars, had one case of cephalhematoma which cleared up without treatment, but so far as I know, there has been no permanent injuries to any of the children. The conviction which has come to me from my experience is, that the forceps properly applied in suitable cases are most useful. The forceps which I have used almost exclusively, are of the Tarnier pattern with powerful but narrow blades. They seldom or never slip and I endeavor never to use sufficient force to do injury to either mother or child. Most of the trouble which arises in the use of forceps, comes from their improper application, or their use in unsuitable cases. I try not to apply them until the cervix is almost fully dilated and also to allow the fetal head to be molded as much as possible. I never apply them to a head which I cannot push well down into the pelvis. There were two Scanzoni applications with eminently satisfactory results. Once they were applied in a breech case where delivery was too long delayed and where I could not deliver the breech by any other method.

*Version.*—I performed version seven times and my impressions of it are such that I am resorting to it less and less as my experience grows. Of seven cases, four infants perished. This bad result was due partly to the malady for which the version was done; two being cases of eclampsia; one a complete placenta previa in a primipara, and one a case of prolapsed cord. Now I would do Cesarean section more and version less in cases when a rapid delivery is indicated, and where forceps could not be safely applied.

*Cesarean Section.*—It was deemed advisable to resort to Cesarean



section seven times in this series of cases. Two were cases of contracted pelvis. Both were seen in consultation. In one, forceps had been tried without success, and in the other, pituitrin had been given repeatedly without causing engagement of the head. One case was one of posterior occipito presentation where in spite of strong pains and after a long trial labor, the head would not descend into the pelvis. One was performed for excessive general edema, where the vulva and vagina were tremendously edematous and where there were evidences of beginning pulmonary edema. The operation was performed under gas anesthesia. One was a case of carcinoma of the cervix and it was followed immediately by the Wertheim operation. The sixth was for placenta previa centralis, and the seventh for threatened uremia from nephritis in a primipara. There was no mortality.

My impressions of the operation are: that its usefulness is great, that in properly selected cases, its mortality is quite low, and from observation and the experience of others that its morbidity in the way of adhesions, rupture of the uterus in subsequent pregnancies, etc., is more than is generally believed. That the tendency to-day is to perform the operation without proper indications is certainly true. I would urge that the operation be done only after the most careful consideration of the indications and, when in doubt, after consultation with an obstetrician of known ability and good judgment.

*The Vaginal Cesarean Section.*—I have done this only once in this series. I find it very useful where the uterus is to be emptied between the third to the eighth month or even a little later in pregnancy, but at full term the same objections are to be urged against it as against version. My case was a primipara, eight months pregnant, comatose and having convulsions, and not in labor. I found that I could push the small head well down into the pelvis. I delivered her with forceps after a vaginal section. Following delivery, she had a number of convulsions and finally became maniacal, tearing off her clothes and requiring the combined efforts of several nurses to keep her in bed. The choice of a vaginal section seemed a happy one and this method of delivery should, in my opinion, be always considered in such cases.

There were twelve *breech presentations* with two fetal deaths. These were both consultation cases in primiparæ, with early rupture of the membranes. In similar cases *Cesarean section* will be done more frequently in the future, not only in the interest of the child, but of the mother, for in these cases there are apt to be deep perineal lacerations.

There were four cases of *transverse presentation*. Two occurred in the same woman. The first time it occurred, I was called in consultation and found a version had been done after the diagnosis had been made. I found it impossible to deliver the head (which remained in the pelvis although the body had been delivered several hours before and every effort made by two physicians to deliver the after coming head) until a craniotomy was performed. The second time it occurred, the procedure adopted is one which I would recommend in similar cases. After labor had started, I anesthetized the patient, dilated the cervix sufficiently to introduce the hand, ruptured the membranes, brought the head into the pelvis in the flexed L.O.A. position and held it there until it became fixed by uterine contraction. The labor then proceeded in the usual manner. In another case seen in consultation where the chest was jammed into the pelvis and both arms protruded from the vulva, a decapitation was necessary. The fetus was dead when I first saw the case. In the fourth case, seen also in consultation, I found the cervix fully dilated, the membranes unruptured. The child was delivered by version.

In none of these cases could I find any satisfactory explanation why this presentation had occurred. In the first case cited here, the diagnosis of transverse presentation was made with the second child two months prior to labor, and although I could bring the head below, it would not enter the pelvis, and in spite of every effort, would revert to its former position as soon as any muscular effort was made. The woman's pelvis was apparently normal, indeed I could find nothing which could account for the condition.

*Eclampsia*.—I have had only seven cases of actual convulsions in pregnancy or the puerperium. One of these was most interesting. A woman who was the subject of epileptic fits became pregnant. The convulsions increased in frequency as the pregnancy progressed. About the end of the seventh month, when I first saw her in consultation, she was in a comatose condition, having convulsions every ten to twenty minutes. The urine contained a moderate amount of albumin and a few hyaline and granular casts. I regarded the condition at the time as eclampsia and delivered the woman by an *accouchement forcè*. The convulsions continued (we actually counted 150) and the patient died. I am now inclined to regard the condition as *status epilepticus*. The lesson to be learned from the case is that in an epileptic, pregnancy should be terminated for less pronounced indications than in a normal individual. The other cases recovered. My method of dealing with the condition was a rapid delivery, followed by free purgation, sweating, morphine and chloral. Two cases

were delivered by forceps, each having one convulsion in the second stage of labor. After delivery, no more convulsions occurred. Three cases in which convulsions occurred before labor was actually begun and in primiparæ, I did a rapid dilatation of the cervix and version. Now I would do Cesarean section where the child was viable and at term in such cases. The seventh case was the vaginal Cesarean section mentioned under that heading.

Three of the seven cases were seen in consultation after the convulsions had set in. In addition to these, I had seven cases in which I induced labor prematurely on account of uremic or other premonitory signs of eclampsia.

My convictions now are that where albumin and casts increase, the high blood pressure continues, and the other signs and symptoms do not grow better in spite of the diet, purgatives, and rest, the sooner the pregnancy is ended the safer for the patient. I think I can say that my cases of eclampsia are growing relatively smaller. In the two cases where the convulsions occurred in the second stage, there had been nothing whatever to make me believe it impending. I would urge all who do obstetrics to keep in close touch with their patients in the latter months of pregnancy, not only make frequent urinary examinations, but actually to see the patients at least once in two weeks.

*Induction of Premature Labor.*—I have induced labor prematurely nine times; seven times for threatened eclampsia, nephritis, etc., and twice in the same patient for a contracted rachitic pelvis. This woman was afterward delivered of a full-termed child without especial difficulty. The method of inducing labor consisted in the introduction of two large bougies between the membranes and uterine wall. Labor pains have in every instance set in within twenty-four hours. The bougies must be large and properly introduced. With a proper technic, the danger of infection is very slight.

*Inversion of the Uterus.*—This complication has occurred twice in my series. The first patient was a primipara who after a long painful labor had been delivered by forceps. The physician who was associated in the case made from time to time a very slightly tentative pull upon the cord, while I gently kneaded the uterus. This was after an interval of thirty to thirty-five minutes from the birth of the child. The uterus contracted intermittently. During one of these contractions, the placenta appeared at the vulva and I could distinctly feel, first the indentation in the fundus followed by the gradual but complete inversion of the uterus. The inverted uterus with the placenta firmly adherent in the fundus, protruded from the

vulva. There was no marked hemorrhage nor shock. The placenta and membranes had to be forcibly detached by means of a gauze sponge. The uterus was irrigated with normal salt solution. The method of reinverting the uterus was the following, which I recommend in all such cases. The inverted fundus was grasped with the hand and the whole uterus and vagina shoved forcibly up to the farthest limits. The upper portion of the vagina thus afforded something to push against. In an interval between contractions, the uterus was easily reduced to its original condition. After being certain that the version was corrected, I gave ergotole to promote contractions, etc. The second case was a doctor's wife with her second child. Without any pull on the cord or manipulation of the uterus, during a pain the complete inversion occurred. In this case the placenta had become detached, except over a small area just in the fundus where it was intimately adherent. The extrusion of the bulk of the placenta pulling by its small attachment upon the fundus of the uterus, evidently caused the inversion. The method used in reducing the inversion was the same as was employed in the first case. There was no shock and no more bleeding than occurs after a normal delivery. In both cases, the uterus after its reduction, behaved in a manner similar to what we see after a normal labor. The convalescence of both patients was quite normal.

*Prolapse of the Cord.*—I lost one child from prolapse of the cord. This case is worthy of report. A primipara anxious for a live baby was found, toward the end of pregnancy, to have a breech presentation. Following the advice given by the text-books, I did a version, by external manipulation several days before the labor was due, thus converting the breech into a vertex presentation. When called after labor had set in, I found the cervix partly dilated, the head below, but not in the pelvis, and a double handful of cord in the bag of waters which protruded into the vagina. I determined I would do what was done in the case of transverse presentation, that is, after pushing the cord well above the brim of the pelvis, to bring the fetal head down and fix it in the L.O.A. position. Upon rupturing the membranes, a great deal of meconium escaped and mislead by this and the rapid fetal heart, my judgment went astray. I did a version and lost the baby. Since that experience, I am inclined to let breech cases alone. The proposed treatment of the prolapsed cord I would follow in every similar case.

There were no cases of *femoral thrombophlebitis*, and no *mammary abscesses*.

One case of *puerperal infection* occurred. The woman, a primipara

was delivered by a hospital interne before my arrival. No vaginal examinations had been made, but the interne had sewed up a lacerated perineum. She recovered without any apparent extension of the infection to tissues outside the vagina and uterus.

There were only three cases of well-marked contracted pelvis, two requiring Cesarean section, and the third, the case mentioned before.

In a considerable number of the patients, slight and transient hemorrhages occurred during their pregnancies, but there was no case of extensive *premature separation* of the placenta.

There were only two cases of *placenta previa* at or near term. In one, a Cesarean section was done; in the other, it was advised, but refused. A version was done and the child was lost.

*Syphilis*.—There were three cases of syphilis. In one the presence of the disease was not suspected until the child developed marked signs of heredity syphilis. The only history of syphilis obtainable was that the mother's father had died in middle age of cerebral hemorrhage. In another case where there was a definite history in the husband, the wife became insane and died a few weeks after the induction of a premature labor. In the third case under vigorous treatment, neither mother nor child showed lesions of syphilis.

There was two cases of *insanity*, one due to syphilis and the other developing as a sequel of eclampsia. Both have been cited before.

I have seen only one case of *hydramnios* of marked degree. The woman had given birth to two premature infants and developed a marked hydramnios about the end of the seventh month. A dead fetus was expelled. The cord was tightly twisted and the child's death was thought to be due to this. Curiously enough, the woman has since given birth to a child that is mentally deficient. The Wassermann test was negative in both husband and wife.

There were two cases of acute *tuberculosis* developing after labor. One case was very misleading. In a woman, strong and robust in appearance and in whom I had no reason to suspect tuberculosis, it was necessary to give an anesthetic for a forceps delivery due to persistent posterior occiput presentation. The anesthetist chose ether. Following labor, the woman developed a bronchitis, and after a few days a temperature ranging from 99° to 100° F. Her chest was examined by her family physician and myself without discovering anything but the bronchitis. To leave nothing undone, I took a culture of the uterus and submitted it to a competent bacteriologist. He found streptococci and although there was absolutely nothing else to indicate an infection of this nature, we gave, by his advice, autogenous vaccines, and with apparently good results. Her fever seemed

to be partly controlled and finally subsided entirely; her sweats continued but were not nearly so troublesome; and the cough almost disappeared. She left the city at this time for her summer home. The process lighted up again and she came to Washington the following winter with a well-marked case of pulmonary tuberculosis. Our attempts to make a diagnosis by scientific means led us astray.

*Heart Disease.*—One case had a pronounced valvular lesion of both mitral and aortic valves of the heart, along with arthritis deformans. She was an old primipara. She would become markedly cyanosed with every pain, but the labor was rapid and she made a good recovery from it.

Two of the children had *hemorrhages from the gastrointestinal tract*. Both were apparently cured by the use of horse serum.

Two patients had attacks of *acute cholecystitis*, one during pregnancy and one during the puerperium. Both recovered without operation.

Four of the deliveries followed the operation of *uterine suspension*. No noticeable complications of the operation arose in either pregnancy or labor. One had a retroversion before she became pregnant and it still persists. Of the other three, the uterus in two remained in good position after labor, one had a retroversion which was apparently cured by the use of a pessary for a few months.

There were no cases suggestive of *pyelitis* in either pregnancy or during the puerperium.

In several of the cases *fibroid* tumors were present in the uterus, but gave no real trouble in either pregnancy, labor, or in the puerperium. I have been compelled a few times to operate in pregnancy upon uterine fibroids or upon ovarian cysts, but these cases did not fall in this series.

Two rather interesting observations were made upon *cyanosis* in the *infant*. In one case the administration of nitrous oxide and oxygen was apparently quite satisfactory so far as the mother was concerned. She showed no bad effects from the anesthetic. The child, however, when born, was extremely cyanotic and continued so for several minutes. Noticing that the cord was strongly pulsating, I directed the anesthetist to administer oxygen to the mother. The color of the child immediately began to improve and in a few minutes was quite normal. What the result to the child would have been had the placenta become detached while the lividity persisted, is problematical. In another child, two weeks of age, the occurrence of a marked lividity persisting several hours, caused a consultant (a pediatricist) and myself to make a tentative diagnosis of congenital

cardiac defect. The mother was convinced that the trouble was caused by the use of a dusting powder which the nurse had employed. It was found upon investigation that the powder contained anti-pyrin. It was immediately discontinued, the cyanosis did not reappear.

*Retroversion of the Uterus.*—A considerable number of my cases had a retroverted uterus when they became pregnant. Most of them required no treatment. Several times it was necessary to give an anesthetic in order to put the uterus in position to avoid miscarriage. Several times a pessary was used to keep the uterus in position. A number of miscarriages occurred as a result of the retroversion before anything was done to correct the malposition. One patient who had gone through one miscarriage, consulted me when about two months pregnant the second time. I found the uterus sharply retroverted. Using the most scrupulous care in my technic, I replaced the uterus and introduced a pessary which had been soaked in a solution of bichloride of mercury and then held for a short time in boiling water. Boiled gloves were used for my hands. She miscarried, became infected and still suffers from the results of the infection. There was a slight bloody discharge from the uterus when it was replaced and the pessary inserted. In a similar case, I would allow the hemorrhage and other signs of miscarriage to subside before attempting to correct the misplacement.

The necessity for making a vaginal examination *subsequent* to labor is shown by the fact that forty-five women (15 per cent. of all my cases) when examined from two to six weeks after delivery had retroverted uteri. In some, the retroversion would undoubtedly have corrected itself in time, but in the majority, the women would have been left with the backache, tendency to prolapse and other ills incident to this condition. In perhaps one-half of the cases, the replacement of the uterus into its normal position along with the knee-chest posture twice a day for a few weeks was all that was necessary to affect a cure. The majority of the remaining cases required the use of the pessary to hold the uterus in place for a month or more before they were relieved. In a small number, as soon as the pessary was removed, the uterus would become again retroverted. These cases, as a rule, had the malposition previous to pregnancy.

There was one delivery following the use of the Wylie plug for the cure of sterility. The patient had been married a couple of years and was anxious for a child. She consulted an eminent gynecologist in another city who recommended this treatment. The plug was introduced just before an expected menstrual period. She never

menstruated again. The beginning of nausea and the date of child-birth made it appear most likely that she was pregnant when the plug was introduced.

*Repairs of the Perineum.*—The immediate repair of any perineal laceration was the rule. One case who had a complete laceration and whose condition was not satisfactory, was allowed to go until granulation tissue had disappeared before the laceration was repaired. The *cervical* tears were not repaired immediately after delivery.

*Deaths of Mothers.*—Three mothers died in my series of 300 cases. All were cases seen in consultation. One was the case of status epilepticus. Another was a woman who had been in labor four days. Several attempts at forceps delivery had been made by two physicians. I found her with a temperature of about 103° F., rapid pulse and the child dead. I did a craniotomy, and had great difficulty in delivering the child which weighed 12 pounds. The perineum was badly lacerated. The woman died of infection. The third case died of postpartum hemorrhage and shock following delivery. The patient when seen had been in labor more than twenty-four hours. After waiting twelve hours for dilatation of the cervix to take place, the temperature of the patient rose to 103° F. and she showed other unfavorable symptoms. An attempt was made to deliver with high forceps through a partly dilated cervix, which failed. The patient's condition grew so alarming that a craniotomy was done. The patient died a few hours after delivery. Although a Cesarean section was apparently contraindicated, it could not have been more disastrous.

As stated before, all the fatalities were in consultation cases. Consultation obstetrics is generally most unsatisfactory. One is, as a rule, called after the harm has been done. Where you have had a case under your observation during pregnancy and labor, you are in a much better position to know what should be done, than when called late in labor and can have no definite knowledge what has preceded your advent.

*Fetal Deaths.*—There have been nine fetal deaths. Two were cases of posterior occiput presentation in old primiparæ. Both children were lost, I am convinced, by too long delay in the use of forceps. Two deaths were due to a breech presentation with early rupture of the membranes in primiparæ; one was the case of prolapsed cord; one was due to a version in a woman having convulsions. One fetal death was due to the excessive size of the child. After delivery of the head, there was so long a delay in delivery of the shoulders that



the child could not be resuscitated. The ninth death was due to craniotomy in the case mentioned before. These nine deaths were the only ones which occurred in children who had reached a viable age and who were alive when I took charge of the cases.

*General Impressions.*—There are certain convictions which have come to me in my practice of obstetrics. Some of these are as follows: That we should carefully examine our patients when they first come to us, especially with regard to pelvic structures and abnormalities, and that we should watch them carefully through their pregnancies, seeing them and examining the urine at least every two weeks; that the danger of infecting patients when we use proper precautions is very slight (I have no dread of detaching an adherent placenta or introducing the hand into the uterus for any indication provided I have had charge of the labor from the beginning); that the misfortunes which attend the use of forceps are due to their improper use; that the use of twilight sleep, prolonged gas anesthesia, the too free use of morphine, chloroform, ether, etc., increase the danger to both mother and child, but especially the latter; that in the future I will try to relieve the sufferings of my patients by using morphine, etc., a little more freely in the stage of dilatation of the cervix, in spite of my belief that it prolongs rather than shortens this stage; that much harm has arisen from the abuse of pituitrin.

Finally, I believe that the ideal obstetrician is one who is also a gynecologist and who has at all stages of pregnancy and labor an accurate knowledge of the condition of the mother, and in labor of the child also, who keeps himself informed of the progress of labor, and who does as little as possible to interfere with the processes of nature, but who is prepared to act promptly and fearlessly when interference is demanded.

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#### REPORT OF A CASE OF SEPARATION OF THE PUBIC SYMPHYSIS IN A FORCEPS DELIVERY AND THE TREATMENT EMPLOYED.

BY

J. M. ALLEN, M. D., F. A. C. S.,

St. Johnsbury, Vt.

THIS patient, aged twenty-four, primipara, was first seen by me about thirty-six hours after a forceps delivery of a living child, and was found to have suffered a separation of the pubic symphysis, the interval measuring over 3 inches in width. There was marked laceration of the soft parts and there was loss of control of the bladder. The separation was readily reduced but it was very

difficult to maintain the bones in good position, so a Lane plating was decided upon. This was carried out with no great difficulty, a four-screw plate and supporting straps of adhesive plaster being used. The patient was put in care of a so-called "domestic nurse" whom I afterward found was so stirred with pity for her unfortunate patient, because moving was so painful, that when she had occasion to turn the patient in bed she would roll her quickly so that "it would not hurt her for so long." Whether this was the cause of the bad result or simply a factor, or whether the bone being of such character as regards the thin layer of firm bone in the os pubis that a Lane plate would not avail, with the best of after-care, I do not know. At any rate after some weeks the bones were found to be separated about the same as before and in addition there was a small fistulous opening extending to the loose end of the plate. She was brought to Brightlook Hospital and the following treatment was devised. After the removal of the Lane plate it was seen that the bone was much too weak to again support a plate with any prospect of success. Therefore two half-inch incisions were made over the iliac crests at the upper anterior iliac spines and two ordinary wire nails, each about 2 inches in length and of sufficient diameter to endure the strain which would be placed upon them, were driven into the iliac crests, an endeavor being made to try and follow the normal slope of the ilium, so that the nails would be entirely in bony tissue, and these nails were left protruding above the skin about  $\frac{1}{2}$  inch, then, with assistants pressing the bones firmly together, care having been taken that no soft parts were between the bones, some sterile iron wire, of the size used to support a stove-pipe, was wound tightly around the nails from one side to the other, across the abdomen, three full turns being employed, and a tightly fitting plaster cast was put about the pelvic bones. While this cast was setting the patient was held up in a sling, which tended to hold the pubic bones in perfect apposition, and then the patient was put in a trough-shaped bed. In less than eight weeks she was up and walking and at the present time—nearly two years after the operation—she is in perfect condition. It has occurred to the writer that had he to treat many of these cases he would devise a modification of the old Malgaigne hooks with an extension screw long enough to cross the abdomen, which, in conjunction with a plaster cast, would hold these cases perfectly.

24 RAILROAD STREET.

## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

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*Meeting of December 7, 1916.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

*(Continued from April.)*

DR. R. L. DICKINSON, New York, presented a paper on  
THE USE OF THE CAUTERY IN CARCINOMA OF THE CERVIX UTERI  
(THE BYRNE OPERATION).\*

### DISCUSSION.

DR. VICTOR L. ZIMMERMANN, Brooklyn.—I assure you that it is very gratifying to us who live in Brooklyn to see a revival of interest in an operation for cancer of the cervix originated by our distinguished fellow townsman, John Byrne. As Dr. Dickinson has told you it was my good fortune to be associated with him during the later years of his life, and to have seen at close range what was probably his best work. Dr. Byrne who died in 1902 was well known to many of you, and will be remembered as a kindly gentleman of high education and very strong convictions. After electrocauterization had been introduced by Mideldorph of Breslau about 1856, Dr. Byrne suggested its application to amputation of the cervix for cancer. Being a man of a great deal of mechanical skill he devised several really wonderful batteries. He overcame almost insurmountable difficulties in getting sufficient heat to do his operations—obstacles which were to disappear at once for us upon the general introduction of the electric street current. Byrne founded a hospital exclusively for the treatment of surgical diseases of women, which soon grew to large proportions, and is at present a large general hospital. Attracted by his writings and referred by many practitioners, there flocked to this hospital large numbers of women afflicted with this terrible malady, and he had a great mass of material upon which to try out his ideas. Up to this time the prescribed treatment of cancer of the cervix was vaginal hysterectomy, at that time attended with a pretty high primary mortality. In advocating his cautery operation Byrne unmercifully attacked the operation of vaginal hysterectomy on account of its mortality, while he claimed for his cautery procedure practically no primary mortality. Many of you will remember the acrimonious discussions which were waged backward and forward in The American Gynecological Society, upon the relative merits of the two operations. Then Byrne presented some

\* See original article page 737.

statistics of results in cautery which were astounding, and at once harshly criticised; principally on the ground that in most instances his cases lacked microscopical proof of malignancy. But we know to-day that the man with the microscope is not infallible, and for this reason, I think, the objections on that ground were not well taken. And by no means all of Byrne's cases went unverified by the microscope—I well remember practically the last case Dr. Byrne operated upon before a clinic, it was early in 1901, when he was invited by Dr. Henry C. Coe to operate upon a case of cervical cancer in the General Memorial Hospital of New York. On the way to the hospital he said to me, "We will probably have no operation to-day; for invariably when I am asked to operate in another clinic they have a case so far advanced that it is inoperable by any method." But when he examined the patient his face lit up with his kindly smile, and turning to the audience of well-known gynecologists, asked them to scrutinize the cervix, from which a piece had been removed for examination, and said that it was a proper case for his procedure. He did a beautiful operation, using his own old liquid battery. Last year at a clinic by Dr. Percy, held in the same amphitheater, Dr. G. H. Mallett told me that to his personal knowledge, that patient was still alive and free from cancer.

I think I can discern a tendency to come back to the ideas of Byrne, and I am sure it is on account of dissatisfaction with the results of other operations. I cannot help but feel, however, that the indications for the typical Byrne operation are not well understood. To give an example: Recently in our own city I heard a surgeon citing the history of a case of cancer of the cervix, in which he stated that the growth was so far advanced, involving as it did the parametrium and vagina, that he deemed it wise to do a Byrne operation and cauterize the mass. That was certainly not a Byrne operation, but would be classified as such, and recorded as a failure. Such talk brings the operation into disrepute. Another drawback for the operation is a lack of confidence on the part of some of those using it. For instance: Some time ago I was invited to one of the large hospitals in New York to see a Byrne operation. Everything was in readiness, but when the operator made his examination under anesthesia, he said that it was such an early case, with so little involvement, that he could not resist the temptation to do a vaginal hysterectomy instead, thinking it would give a better chance for ultimate cure. This was a typical case for a Byrne operation, and I feel would have been less productive of shock, less dangerous, and better from a prognostic point of view.

I think we must keep rigidly before us the proper indications for this operation, viz., growth limited to the portio vaginalis—the epithelioma, and the adenocarcinoma originating in the cervical canal. With growths originating above the internal os, the Byrne operation has no place.

DR. BARTON COOKE HIRST.—I had the privilege of seeing Dr. Dickinson do one of these operations and came away profoundly impressed with the very thought to which he has given expression,

that the operation was one of no mortality, no morbidity, an operation that can be done by the average casual operator in a small community, and an operation which so far as we can learn effects a permanent cure as well, if not better, than any other operation hitherto done. I have watched Dr. Percy operate, and to my mind this Byrne operation as done in Brooklyn is infinitely superior. While I went to Brooklyn at considerable inconvenience I know of no visit to any clinic that has seemed to me so much worth while as that to Dr. Dickinson's and I am naturally grateful for the opportunity he kindly gave me to observe his work.

DR. JOHN G. CLARK.—In the many papers which have been presented on the question of cancer of the cervix during recent years it is evident that one most important fact is revealed, viz., cancer of the cervix can only be cured through surgical intervention while it is a local disease and that we cannot expect to materially lessen the mortality by any operation when metastases have already occurred. In Wertheim's published list of 500 cases one may look in vain for any encouragement so far as increasing ultimate cures are concerned by the removal of the pelvic lymphatic glands, as there are only a few cases in which the microscope has shown the lymph nodes undergoing carcinomatous change that have passed the five-year limit. When we consider the very high price paid for these few cases in the larger mortality incident to the extended operation when it includes the glandular stage of the operation, I cannot help but feel that we come back to the primary proposition, namely, that only by the thorough removal of locally involved tissue are we to hope for cures.

I have passed through the enthusiasm of the extended operation and have my own statistics of more than fifty operations to sustain my skepticism as to the value of glandular extirpation. In all of the cases of my series which have passed the five-year limit, I am assured by our laboratory tests that the disease had not exceeded a limited local involvement of the cervix and vagina, making it possible to get well outside of the lines of invasion. Concerning the radical procedure, we have come more and more to the conviction that when the case is widespread that the high mortality attending the operation and the prompt recurrence of the growth in the largest percentage of the surgical survivors impels us to the limitation of our efforts to those in which the disease is well localized. Formerly, we were inclined to reach out for the widest operative possibilities because we felt there was nothing that would help these cases outside of surgery. We still feel that surgery stands ahead of every other remedy. However, in the cases where we are now in doubt as to operative possibilities we immediately resort to radium, which has given us such remarkable results in many of our cases. We still look on the therapeutic procedure as a palliative measure, although we have many startling cases which seem to indicate an enduring cure in some of our inoperable growths.

We never use radium in cases of carcinoma of the fundus because here we have the striking proof that so long as cancer is a local disease it can be cured, for metastases take place very late from this

region of involvement. On the other hand, cancer of the cervix follows the opposite rule. Consequently in the latter, rather than subject the patient to a highly dangerous operation with the probability of wretched sequellæ, we have adopted the rule that in case of doubt, resort to radium, feeling that in this course we are doing the best possible for our patient.

We have been particularly interested in Dr. Dickinson's portrayal of Byrne's operation. I have known the principles underlying this operation but I have never before actually understood the actual details of its execution. From Dr. Dickinson's description, it is quite apparent that Byrne really was doing a rather extensive local operation with his cautery in the high amputation of the cervix since but a very small part of the uterus is left after such a procedure. This also is based upon good pathological reasoning, for in the most extensive cases of cancer of the cervix the fundus is but rarely involved either through metastasis or by continuity; hence, in the wide removal of the cervical portion of the uterus Byrne has met the pathological indications. Dr. Dickinson puts his finger upon the main issue in this question when he states that a man's personal experience must be his guide as to his choice of operation. In all surgical operations, and, particularly in these more difficult procedures, no two men ever follow a pattern and execute their work with equal precision. Consequently, in one man's hand excellent results may come from a plan which brings disaster to the other. All of us who know Dr. Dickinson appreciate the fact that when he makes any statement, although he may be wrong, nevertheless the statement is based upon absolute truth as he sees it, and, therefore, we can confidently accept what he has given us this evening with the full assurance that he speaks with conviction when he says that the Byrne operation has given such excellent results.

DR. JOHN B. DEEVER.—I have been greatly interested in Dr. Dickinson's paper. The statement of a five-year cure with this treatment certainly appeals to any rational mind. Whether I shall put the treatment into effect or not I cannot say to-night. I have never cured any case of carcinoma of the cervix except by taking out the uterus. Dr. Dickinson has cured them by burning them out, so that speaks for itself.

DR. RICHARD C. NORRIS—We have all thought a great deal about this problem. I remember several years ago upon looking over my records of finding, during a period of five years, one case in which I thought it justifiable to operate by this method. During that period I found the proportion of cases, operable by any radical plan, to the inoperable cases was one to fourteen. Nothing has come to my knowledge to make me think that we have made much progress in the surgical treatment of cancer since that time. The success of surgery depends upon the degree of involvement which is the stage at which we see these patients, and clinically upon the virulence, shall I say, of the particular case. Of two cases identical in every respect, subjected to complete hysterectomy and each subsequently treated by x-ray, one was dead in four months, the other

is still living ten years after the operation. Roughly speaking, these are the ideas I have had for a number of years, that if you happen to strike carcinoma just at the beginning and you remove the growth and an area beyond which the carcinoma happens not to have extended, the woman's chances are to get well. If you have further involvement and do a major operation and your incisions go beyond that point she has a chance of recovery, and if you do a Wertheim operation and chance to get beyond the area of involvement you may save that woman's life. If we had any way of knowing the degree of involvement we could suit our operation to the case in hand and meet with better results in the roundup of our statistics. If Dr. Dickinson's cautery cooks to a certain area, dries up lymphatics and controls hemorrhage, but beyond that point fails to destroy cancer cells his method, to my mind, is no better than Percy's, which we have found to fail. In our surgical work, even with Wertheim's operation, if we do not reach and go beyond the areas invaded with carcinoma, the operation fails. That seems to me the secret of the whole problem and the secret which baffles us. The important element from the standpoint of surgery is to educate people to consult their physician early and educate the physician to seek the surgeon early. I believe that Dr. Dickinson's cautery operation will be successful in the early cases; often more successful in early cases than vaginal hysterectomy. In the Wertheim operation we reach a certain number of cases and save the patients in which neither the Percy nor the Dickinson operation would be of avail. But what man will stand the mortality of the Wertheim operation in every case for the chances of saving the few there may only be saved by that operation? We are just as helpless as we were years ago and we must hope for a cure of advanced cancer from some other source than surgery.

DR. GEORGE ERETY SHOEMAKER.—For a number of years I have been fond of the use of the cautery in the treatment of cancer and I have been impressed with the success of the Byrne method as reported by him. I believe that some of the good results that undoubtedly follow this method of treatment follow because we early cut off channels for dissemination and do not squeeze and manipulate the mass with which we are dealing. In a great many operations and in a great many cases of cancer I believe we do a tremendous amount of damage by our manipulations. With the Byrne operation this is not done. In this day no one would dare grasp an epithelioma of the face or lip or a carcinoma of the breast with a tenaculum or lion jaw forceps and then drag on the tissues, yet a man might do that very thing in carcinoma of the uterus.

DR. JOHN A. MCGLINN.—I have three specimens which I wish to present which will illustrate the subject under consideration. These specimens are cancer of the cervix which were removed by extensive abdominal hysterectomy during the past few weeks.

In the first case from our examination, it seemed as if the disease were limited entirely to the cervix. You will observe, however, that the entire body of the uterus is diseased. This case resulted in an operative death.

In the second case, there was a mass involving the cervix as large as a hen's egg. The mass was removed by cautery and this was followed by an extensive Wertheim operation. In this case there was no evidence of pelvic involvement.

The third case was operated upon yesterday. It was apparently a favorable case for radical hysterectomy. From our examination, it seemed as if the disease was limited entirely to the cervix with no pelvic metastasis. When the broad ligaments were opened, however, we found the uterine artery and ureter on the right side completely surrounded by a small growth of cancer; the cancer mass also extended out to the wall of the pelvis. We also found the base of the bladder involved.

In these three cases, which apparently from the examination, would have been suitable for the Byrne in reality, only one, namely the second, would have been suitable for this treatment. I believe that these three cases had the proper treatment, namely, an extensive surgical removal of the disease. In cases in which the Byrne operation is suitable, I believe it to be superior to hysterectomy . . . for the reason that primary mortality is lower, that all the diseases is as completely removed and that all channels for metastasis are sealed. The difficulty as I see it is in the proper selection of cases as illustrated by these specimens which I have presented to you.

DR. G. W. OUTERBRIDGE.—I should like to ask Dr. Dickinson what the cautery method of Byrne has to offer in those cases which are somewhat beyond the very early stage, that is, where the parametrium is definitely involved to some extent. We all know, of course, that the very early cases, where the malignancy is still definitely localized to the cervix, give good statistics when approached by almost any method of attack.

DR. SWITHIN CHANDLER.—I should like to ask Dr. Dickinson whether there has been any case of embolism following this operation and what his opinion is in regard to the difference in the injury produced by the heat and that by the knife and clamps.

DR. E. E. MONTGOMERY.—I have heard Dr. Byrne during his life present papers and always found him exceedingly interesting. I have practised the employment of heat by the thermocautery but of late years have used the galvanocautery. The great advantage of the latter is the employment in cases in which the cervix is extensively diseased where it can be used to curet and burn off the tissues preliminary to hysterectomy. It prevents the transplantation of cancerous cells in the open wound which is not infrequently the cause of recurrence. My inclination has been to remove the entire organ rather than to leave a part when the organ is the seat of disease. The further we can get around the disease the more effective will be the procedure. In cases of secondary involvement and in cases of periuterine structures there is no operation which is going to prove successful. We often see cases in which enlarged glands can be enucleated and are due to an inflammatory infection rather than malignant disease. The Society is greatly indebted to Dr. Dickinson for his presentation. My knowledge of his work for many years jus-



tifies me in saying the Society may well believe anything he presents as his experience.

DR. DICKINSON, closing.—There were no cases of embolism in Dr. Byrne's reports, nor have we had any.

As to the parametrium involvement, I think Dr. Norris exactly hit the nail on the head, if we can get safely outside the area of involvement we save our patients; otherwise, we do not.

Why then is not simple knife-work better than the cumbersome-ness of the cautery? I should have said emphatically, and the point has been made in discussion, that the only reason is the sealing of the absorbents, unless, as is supposed, there is some deadly effect on distant cancer cells from radiated heat. The degree of heat cannot have the effect in disintegrating the blood that the Percy heat does as the Byrne knife will cook only in spots of small area at a time, where the Percy steadily heats large areas for over an hour.

We shall not have a perfect follow-up system until the police follow our cases for us as they will in Germany. We are doing all we can in the follow-up but our tenement patients move from place to place and disappear. All I ask is that having had poor results from other methods, we try a method in which the mortality is low, and morbidity and suffering are practically absent.

*Meeting of January 4, 1917.*

*The President, WILLIAM R. NICHOLSON, M. D., in the Chair.*

DR. CATHARINE MACFARLANE presented the

**REPORT OF TWO CASES OF METRORRHAGIA ASSOCIATED WITH CORPUS LUTEUM CYSTS.**

The interest of these cases lies in their bearing upon the rôle of the corpus luteum in menstruation, and from this viewpoint they seem not unworthy of presentation before this Society.

CASE I.—Mrs. C., thirty-eight years old, a strong, healthy woman, married seven years, never pregnant. Menstruated first at fourteen and regularly every four weeks thereafter until the age of thirty-four, after which her periods came irregularly every two to three weeks and she flowed freely for three or four days.

*Present Illness.*—On February 3, 1915, the patient commenced to flow and continued steadily for five weeks in spite of medical treatment. At the end of this time she was put to bed in the Woman's Hospital and was given pituitrin by hypodermic. After four days the bleeding ceased, but reappeared as soon as the patient was allowed that of bed. Curettage was then decided upon.

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**Operation.**—At operation the nulliparous uterus was found so relaxed that curettage was readily performed without previous dilatation, a considerable amount of thickened endometrium being removed. Under anesthesia a soft, round mass was felt to the right of the uterus, which, upon opening the abdomen, was found to be a thin-walled, nonadherent cyst of the right ovary the size of a small lemon. As the Fallopian tubes, uterus and left ovary were found to be normal, the right ovary alone was removed.

**Pathological Examination by Dr. Berta Meine.**—Specimen consists of many bloody uterine curetings and an ovary containing a thin-walled cyst with clear contents and a brownish lining; the remaining surface of the ovary is slightly irregular.

**Microscopic Examination.**—Curetings consist of endometrium containing numerous long and tortuous glands, many of which are distended and cyst-like. The epithelium varies; in some it is a single layer of high columnar cells; in others these appear to be flattened. Many of the glands are filled with a serous, others with a bloody secretion. The stroma is congested and edematous. There is very little round-celled infiltration and very few plasma cells.

**Intramenstrual Endometrium.**—The sections show slight hyperplasia in areas.

**Ovary.**—The cyst wall is lined with a comparatively thin layer of lutein cells, many of which stain poorly and show vacuolation. Beyond this is a zone of hemorrhagic infiltration, and then one of denser fibrous tissue. In all portions of the ovary the dense fibrous tissue and the congestion are marked. In one area the arrangement and the structure of the individual connective-tissue cell is suggestive of soft fibrosis. *Corpus luteum of ovary.*

**Result.**—Four weeks after the operation the patient had a normal four-day period and continued to menstruate regularly until October, 1916, when, after some mountain climbing, she menstruated at two- or three-week intervals for three months. Under pituitrin the periods became regular again and continued so.

**CASE II.**—Miss Annie O'B., twenty-seven years old, a small, thin, anemic young woman. Menstruated first at fourteen, periods regular, lasting six days; for past three or four years periods have lasted nine days.

**Present Illness.**—On November 9, 1915, patient commenced to flow and continued almost steadily until February 8, 1916, when she was operated upon in the Woman's Hospital.

**Operation.**—A moderate amount of endometrium was removed by curettage and upon opening the abdomen a thin-walled nonadherent cyst of the right ovary was found about the size of an orange. The uterus was normal in size, anteverted and bore upon its posterior surface two fibroid nodules the size of shoe buttons; the tubes were normal; the left ovary was thin, flat and covered with scars, it showed no ripening follicles nor corpus luteum. The right ovary was removed, its thin-walled cyst ruptured during removal, discharging several ounces of clear, serous fluid into the peritoneal cavity.

**Pathological Examination by Dr. Berta M. Meine.**—Specimens con-

sist of moderate amount of bloody curetings and one ovary. The ovary has numerous pea-sized and smaller Graafian follicle cysts which are filled with a thin, clear, yellowish fluid and one larger (egg-sized?) cyst, which has ruptured but still contains some thin, blood-stained fluid. The lining of the cyst is smooth and of a brownish color.

*Microscopical Examination.*—The curetings consist of endometrium containing comparatively numerous glands, some of these are corkscrew-like, some show invagination, while others are simple and tubular. The epithelium is high columnar in type, the nuclei are basally placed. The lumen of some of the glands is filled with serous fluid; of others, with bloody fluid. The stroma cells are large and somewhat swollen. There is some congestion. *Intramenstrual endometrium.*

*Ovary.*—The vessels of the stroma are congested. There is some cystic and some atrophic degeneration of the Graafian follicles. The large cyst shows an outer layer of fibrous tissue and a heavy layer of corpus luteum cells which project into the cyst cavity. These show the typical structure and arrangement of lutein cells of the granulosa type. In areas this inner layer is covered with an organizing blood clot. *Corpus luteum cyst of ovary.*

The fluid remaining in the large cyst was tested for its effect upon coagulation time and was found to delay the coagulation of healthy human blood for over twenty-four hours. The patient's circulating blood before operation coagulated in three minutes, fifteen seconds.

*Result.*—Six weeks after operation the patient had a six-day menstrual period and continued to menstruate regularly until November, 1916, when a slight metrorrhagia occurred, which was soon controlled by the administration of pituitary gland tablets.

The prompt and permanent improvement in each of these cases following curettage and removal of an ovary bearing a large corpus luteum cyst tempts one to believe that their metrorrhagia was in some way associated with the corpus luteum cysts; in other words, that the cysts contained some substance or substances capable of maintaining in the endometrium a permanent menstrual phase. In line with these observations is a series of experiments reported in the *Archiv für Gynekologie*, 1912, by Schickele of Strassburg, who found in extracts of ovaries, corpora lutea, Fallopian tubes and uteri a blood-pressure lowering, vasodilating substance and a *coagulation retarding substance* which he termed an *antithrombin*. According to Schickele's theory, these substances are formed in the ovaries (corpora lutea) and added to the circulating blood in small amounts; they are withdrawn from the blood by the endometrium and accumulate in the endometrium until present in sufficient amount to produce the vascular and secretory changes of menstruation; they escape from the endometrium in the menstrual flow and, therefore, menstruation ceases.

If, according to Schickele's theory, normal menstruation results from the accumulation in the endometrium of chemical substances periodically manufactured in the corpus luteum, we are probably

justified in assuming that the metrorrhagia of the above reported cases resulted from the constant presence in the ovary, and consequent accumulation in the endometrium, of similar substances. In this connection Dr. Meine's finding that the cyst fluid of the second case delayed coagulation of normal blood over twenty-four hours is significant.

Although no conclusions can be drawn from two cases, they seem to emphasize the importance of examining biochemically as well as histologically all ovaries removed in cases of metrorrhagia in order that more light may be thrown upon that interesting problem—the rôle of the corpus luteum in menstruation.

#### DISCUSSION.

DR. JOHN M. FISHER.—Those of us who are engaged in this line of work frequently meet with cases of metrorrhagia in which the bleeding remains unaccounted for by the curetment and upon opening the abdomen nothing more than microcysts of one or both ovaries are found. In my experience simple puncture of these cysts in some cases subsequently renders the patient free from the metrorrhagia. I operated at the Jefferson Hospital to-day upon a woman forty-four years of age who had menstruated regularly until some weeks ago when she missed her periods for nine weeks. A bloody flow then appeared which remained more or less copious for three weeks. The resident upon examination found what he supposed to be beginning carcinomatous disease of the cervix. A curetment failed to reveal any form of degeneration and there was no ocular evidence of a carcinomatous change in the hypertrophied cervix which was amputated. Upon opening the abdomen I found a cyst of the left ovary the size of a small hen's egg. Upon incising this I found it had a yellow outline at the margins indicating to me that it was a corpus luteum cyst. I remarked at the time that the metrorrhagia was probably dependent upon this corpus luteum cyst, basing this opinion upon my experience with other cases of a like character. All of the specimens removed were sent to the laboratory.

DR. WILMER KRUSEN.—I want to congratulate Dr. Macfarlane upon this most graphic chart showing the length of time of menstruation. This, it strikes me, is a most valuable part of the history of the case and in her discussion I hope Dr. Macfarlane will tell us how the clots are indicated on the chart.

DR. MACFARLANE, closing.—I am glad to hear of Dr. Fisher's case, from his description it would seem to be similar to those which I have reported. In answer to Dr. Krusen's question about the menstrual charts, the occurrence of pain is marked on the chart by a cross and clots by a round dot in the appropriate square.

At this present day when the recognition of the enormous protective power exerted by an untraumatized peritoneum appears well-nigh universal, and when the surgeon contents himself in critical cases with the least possible handling, the report of cases are illuminating. It is surprising how well the young and the aged will bear

operative interference. C. W. MacGillivray (*Lancet*, June 1, 1907) reports the successful removal of an ovarian cyst from a child eleven months of age, the cyst being first noticed at three months of age. The same writer quotes a child four months of age, successfully operated by D'Arcy Powers. The two cases of ovarian cyst herewith reported present some interesting phases in regard to cystomata.

CASE I.—A. K., white, eighty years of age, married. She had enjoyed excellent health until several weeks previous to my first seeing her when she observed a gradual enlargement of the abdomen, which progressively continued. About one week previously she first noticed an abdominal distress which she ascribed to intestinal indigestion, and considered the abdominal enlargement was due to accumulation of gas in the bowel. Owing to dyspnea she had been compelled to remain for about ten days on the second floor of her home. The facial expression was pinched, otherwise the general physical condition was fairly good considering her age. After careful examination of the abdomen, a diagnosis was made of ovarian cyst, completely filling the peritoneal cavity. Although the question of ovariectomy from its various standpoints was thoroughly discussed with the family, operative interference was steadfastly refused. The abdomen continued to enlarge and routine measurements were taken to demonstrate to the family the steady increase in size of the cyst. The dyspnea became more and more marked and cardiac pressure symptoms later appeared. Tapping the cyst was suggested with the hope of relieving the urgent pressure symptoms; but the performance of this procedure also was refused. Tapping an ovarian cyst is no longer considered a justifiable procedure, either as a curative measure or to give relief in order to postpone the operation. In this particular patient no subsequent operation was to be considered, and I deemed tapping of the cyst a justifiable procedure for the temporary relief of the urgent pressure symptoms, dyspnea and tachycardia. A consultation was suggested and accepted. The consultant concurred in the diagnosis, plead with the family first for operative interference, and failing, then tapping, but without avail. Death occurred one month subsequent to my first seeing her.

CASE II.—S. H. S., widow, seventy-two years of age, seen in consultation August 30, 1916. This patient had been in her usual health until about one month previously, when she first observed that the abdomen had increased in size, accompanied by a vague occasional abdominal distress; to use her expression, at times "the stomach was knotted." Her physician was called in about ten days previous to my seeing her on account of the abdominal distress and an irritable bladder. Upon examination he found the abdomen distended, and a smooth mass about the size of an ordinary fist in the left hypochondrium and the patient very comfortable. The family was told the patient had a growth and she was placed under further observation. Three days subsequently the mass had disappeared and careful palpation failed to reveal its location. The morning of the day I saw her, her physician had made a visit and again found the mass,

this time in the right hypochondrium. Within an hour after he left, the patient collapsed and had excruciating abdominal pain, general in character. Her physician was later obtained, a hypodermic of morphia given and consultation advised which was accepted. Upon my arrival the patient was having a variable amount of abdominal distress, the facies were pinched and there was marked tenderness over the mass above described. The various possibilities as to the nature of the growth were discussed, an acute surgical abdomen diagnosed and immediate operation advised which was accepted and the patient was removed to the Samaritan Hospital and operated. Ether anesthesia.

Upon opening the abdomen, a multilocular ovarian cyst was found occupying the middle and upper abdomen. The pedicle was long and about the breadth of one's hand. There was a twisting of the pedicle which, of course, had given rise to the acute symptoms. There was only one twist of the pedicle, but owing to its breadth it was sufficient of cause strangulation. The cyst originated from the left side, and yet there were no localized symptoms in the left lower abdomen, all symptoms being referred around the umbilicus and toward the right upper abdomen. This may be due to the fact that the cyst occupying the upper two-thirds of the abdomen, had pulled the pedicle upward and over to the median line and the torsion was near the umbilicus. There were no adhesions. The pedicle was clamped, cyst removed, pedicle ligated with plain catgut No. 3, and the stump covered over with chromic catgut No. 1. At beginning of the operation, the pulse was 92, respiration 24, and temperature 98.2° F.; duration of operation thirty minutes. At the end of the operation, the pulse was 64, respiration 20 and temperature 97.8. This patient had an afebrile, uninterrupted convalescence. The urinalysis showed a trace of albumin and a few hyaline and granular casts which one would naturally expect in a woman seventy-two years of age.

The mass first detected upon the left side which disappeared and later was found on the right side, was a daughter cyst about the size of one's fist on the surface of the larger cyst. The twist in the pedicle showed that the cyst had rotated posteriorly from the left to the right side; in so doing, the daughter cyst disappeared during its posterior excursion and reappeared when the rotation was sufficient to bring it forward on the right side. Naturally, the presence on one side, the disappearance and reappearance of this "mass" on the opposite side caused a certain amount of confusion to the attending physician in attempting to reach an early diagnosis.

DR. MACFARLANE also reported a

#### CASE OF CEREBRAL TUMOR.

F. W., admitted to the Philadelphia General Hospital, Womens' Psychopathic Dept., Service Dr. D. J. McCarthy, October 15, 1915. Diagnosis of cerebral neoplasm and consecutive atrophy. November 15, 1915, transferred to Womens' Nervous Dept., service of Dr.

C. K. Mills. March 3, 1916, transferred to Obstetrical Dept., service of Dr. R. C. Norris. April 1, 1916, transferred to my service.

Aged thirty, married, white. *Family History*.—Mother and father living and in good health. Family history negative for cancer, tuberculosis, syphilis, heart or nervous diseases, alcoholism, epilepsy or insanity. *Previous Personal History*.—Patient's birth natural; breast-fed. Usual diseases of childhood. Good recovery, no sequella. Never sick otherwise in her life. Worked around the house. Had no schooling. Received no injuries to head or person. No history of symptoms pertaining to syphilis. *Present Illness*.—About six years ago began to have pain in head, dull and steady in character. Continued steadily to grow worse. Her sight gradually diminished and she was totally blind when admitted to the Methodist Hospital of Philadelphia, June 26, 1914. The pain in the head was accompanied with attacks of vomiting, projectile in character, which came on without relation to taking of food and unaccompanied by nausea. At the above hospital a decompression operation was done over the left parietal region. Effect on restoration of sight negative. Now has headache, which is very severe on coughing. Pain in back. Appetite poor, sleeps poorly, bowels constipated. Never used alcohol or drugs. Coffee and tea in moderation. Never traveled. Height about 5 feet 3 inches. Weight 110 pounds. General appearance good. Head shows evidence of a decompression operation over left parietal region. Hair cut short. Eyes—pupils fixed, widely dilated and somewhat hazy. Do not react to light. Vision lost. Tongue presented in median line. No tremors. Teeth are poorly kept and many are missing. A few cavities are evident. No cervical glandular enlargement. Chest well formed, expansion good, and equal on both sides. No abnormal depression. Mammæ fairly well developed. Examination of lungs, negative. Examination of heart shows nothing abnormal. Sounds of good quality. No murmurs. Inspection and examination of abdomen shows gaseous distention but nothing abnormal. Extremities negative. Patellas normal. No Babinski. No tremors, contractures nor muscular impairment. Skin soft, moist and warm. No scars or tumors. X-ray examination of pituitary region and sella tursica normal. Normality of locomotion undeterminable owing to patient being totally blind. Laughs at times and with difficulty to stop laughing. Is afraid something will harm her at times.

*X-ray Report*.—There is a large trephine opening posteriorly on the left side of the skull. There is also a large osteoplastic flap on the same side. No evidence of cerebral tumor. Mastoid cells apparently normal. Sella tursica is somewhat deep, the posterior clinoid process is broader than normal and somewhat roughened. With the exception of a trace of albumin, the urinalysis has been negative. Cerebrospinal fluid for Wassermann, negative. Sputum, negative.

The following report was obtained from Methodist Hospital shortly after the patient was admitted to the Philadelphia Hospital: Wassermann, negative; spinal fluid, Noguchi, weakly positive; fluid came out with considerable pressure, clear; Nownes' reaction, nega-

tive; Fehling's solution reduced; total cell count, 2 W. B. C.'s to 1 C.C.

*X-ray Examination.*—Pituitary region, negative. Sella tursica, normal. One large cavity instead of normal multinumerous cells in mastoid on both sides. Eye, grounds. *First examination.* Tension, normal. Globe rotates freely in all meridians. Media, clear. Discs plainly outlined, somewhat hazy, edematous, not choked, rather gray in color; veins congested and in numerous places positively torturous. A few branches of the central artery appear reduced in caliber. Retina and choroid quite normal. The restlessness of the patient and the constant rotation of the eye make a careful study of the eye ground quite difficult. *Second examination.* July 21, 1914. Pupils still widely dilated and do not appear to react to light. Tension, normal, disc clearly outlined. Somewhat hazy and of fairly good color, not choked. Central vessels quite normal and the earlier congestion and torturous condition of the veins now practically like that seen in the healthy eye ground. When a candle is carried to the left side there seems to be feeble light projection. All in all the fundus picture has improved since the operation. August 11, 1914, pupils continue widely dilated and without reaction to light. Media, clear, disc of good color, not choked. Margin distinct, central vessels now appear quite normal. General picture of each fundus, healthy. Patient discharged from Methodist Hospital August 18, 1914.

October 28, 1915, Dr. Herbert J. Lloyd records the following: Patient sits about and is quiet. Laughs at times without provocation. November 1, 1915, patient shows no physical or mental improvement. November 12, 1915, totally blind, apprehensive, afraid of shouting patients. Cleanly in habits. Quiet. Jumps if touched. Complains of pain in back and shoulders. Has not vomited this week. Sits by herself talking and laughing to herself. Never noisy or hurts anyone. Does not hear voices or see things. November 12, 1915, seen by Dr. C. K. Mills. Diagnosis cerebral neoplasm and consecutive atrophy. To be transferred to Womens' Nervous Ward. Admitted to Womens' Nervous Ward, November 15, 1915. Patient very silly and childish. Very timid and fearsome. Skin is generally hypersensitive, especially so over both legs, particularly over the soles of the feet. Very tender to pressure or percussion over scalp. Large cerebral hernia left parietal region. Totally blind, both pupils dilated and do not respond to light. States she cannot see any bright light flashed before the eyes. No facial palsy or any local palsy. Moves tongue well in all directions. Speech foreign but no slurring or difficulty in articulation. Swallows well. Moves hands well in all directions. No weakness noted either side. Pronates and supinates wrists well and rapidly. No ataxia. Legs, gait, walks well and steadily for a blind person. Station very good. Swaying only slightly. All tendon jerks are very sensitive, but all joints are freely movable. No palsy in feet. V.J's both quiet and inclined to spasticity. Patella and ankle clonus can be elicited on both sides. Impossible to get plantar response on



account of extreme sensitiveness of feet, she quickly pulling them up under her when they are stroked. Impossible to get sensibility correctly on account of patient's silly attitude to the procedure. Apparently hypersensitive to pain all over. Good control of bladder and bowels. Heart action regular, strong, no murmurs, Lungs, negative.

March 3, 1916, owing to the abdominal enlargement, Dr. Berhard was asked to make a pelvic examination. A diagnosis of pregnancy was made and the patient transferred to the obstetrical service. May 1, 1916, no improvement in patient's mental or physical condition. Patient appears to be slightly weaker than when she was admitted. Appetite good. May 16, 1916, began with convulsions, irregular in occurrence. Subsequent to delivery in some days had four convulsions in a few hours. Urinary incontinence at times. On other occasions required catheterization. Occasionally asked for urinal. Bowels require daily enemas. May 17, 1916, had attack similar to yesterday's which was not quite as long in duration. Had another convulsion while above note was being made. Patient suddenly turned on left side, made no sound, arms became rigid and directed forward and downward, both eyes directed upward and to the left. This lasted about five or ten seconds and patient then became relaxed and eyes were staring and fixed. Patient apparently became conscious in about thirty seconds, but not enough to answer questions, although she seemed to know she was being questioned. Pulse rather rapid but regular and of good tension throughout. Patient bit lip during convulsion and in a few minutes after having had convulsion, went into restless sleep in which her mouth twitched, usually on right side, sometimes on both sides. May 18, 1916, patient has been having convulsions for the last three days. At 4 P. M. the patient had one of these convulsions and the nurse went over to her and noticed that the fetal head was being born and the body followed shortly, child alive. Placenta expelled in twenty minutes.

Patient died May 20, 1916. No autopsy permitted.

This woman indeed was a pitiable object. Totally blind, acting not unlike an imbecile. Although the nurses were cautioned to watch this patient carefully for symptoms of labor, the fetal head was born without labor being detected. The patient had just terminated a convulsive seizure when the nurse suspected that the attitude assumed was suggestive of "bearing down," made an inspection and found the fetal head expelled. A living child was delivered. The placenta was expelled spontaneously twenty minutes subsequently, labor was apparently normal in all respects and the placenta delivery was accompanied with a very slight amount of bleeding.

The question arose in this case, should the pregnancy be terminated. The diagnosis of pregnancy not being made until about the seventh month, and there being no untoward symptoms, it was deemed expedient to allow the pregnancy to continue.

About the expectant time of delivery, convulsive seizures began and the question again arose, should labor be induced. It was

decided that inasmuch as the convulsive seizures were apparently due to the cerebral neoplasm, and the fetal heart sounds showed no appreciable change after each convulsive seizure, to allow pregnancy to continue until normal labor occurred, unless the fetal heart should show evidence of impending fetal danger. Blood pressure ranged 100 to 115.

I would ask, Mr. President, that any discussion of this case be as follows:

If pregnancy had been discovered in the early month of gestation, would a therapeutic abortion have been indicated? Should labor have been induced at the time diagnosis of pregnancy was made (seven months)? Were the convulsions *per se* an indication for inducing labor?

DR. FRANK C. HAMMOND presented reports of the following cases:

- (1) ON THE OCCURRENCE OF OVARIAN CYSTS IN THE AGED.
- (2) PREGNANCY AND LABOR IN A CASE OF CEREBRAL TUMOR.

#### DISCUSSION.

DR. JOHN A. MCGLINN.—I have had two cases of ovarian cyst in old women. One was a woman of seventy-eight years, living in Chester. I was first asked to see her on account of prolapse of the uterus. For this I advised a mechanical support. This failed to keep the uterus up and I was asked to see her again, the son telling me that he believed there was something wrong in the abdomen, which was greatly distended. A tumor was found to be present containing 8 gallons of fluid and weighing 80 odd pounds. The woman made a good recovery. I operated under local anesthesia until the contents of the cyst were sufficiently reduced to allow the giving of a general anesthetic.

Another case which I saw was that of a lady of seventy-two years who had a cyst weighing 67 pounds. The tumor proved to be a malignant papillomatous cyst. A number of the papillomata were on the bladder, broad ligament, rectum and sigmoid. The cyst was removed but it was impossible to remove the entire amount of malignant disease because of the organs involved. The patient was treated by deep röntgen rays by Dr. Pfahler and she lived for seven or eight months subsequent to the operation in comparative comfort and died practically of general exhaustion from the toxemia of the malignant condition. One very interesting phase of this case was the tremendous distention of the colon after operation. The diameter of the distended colon was from 4 to 4½ inches.

DR. B. F. BAER.—More than twenty years ago I had the odd experience of operating, on consecutive days, upon two patients, each eighty-three years of age.

The first, referred by the late Dr. B. Trautman of this city, had a small tumor which had become so painful that she and her family, and indeed the neighbors, who were annoyed by her outcries, begged that relief might be given, even by operation.

The other, a patient of, Dr. John Marcy of Merchantville, N. J.,

had a large fluctuating tumor, which had distended the abdomen to the size of term pregnancy. Her health was failing as is usual in such cases, but her kidneys, her heart and lungs were sound, and as these did not appear to be a contraindication, operation was advised. Both of these patients recovered promptly and lived for years afterward, into the nineties.

Another case of very large cystic tumor, brought by Dr. Frace of Clinton, N. J., seventy-six years of age, was operated and lived for many years after.

I have operated upon a number of cases that had passed seventy, some ovarian cystic tumors, and in two or three instances hysterectomies for cancer; in many more between sixty and seventy. Recovery was always as easy as in the younger women. Mere age would seem, therefore, not to be a contraindication. I was interested in Dr. Hammond's paper, especially in the obstetric case, but I have not had any experience in the latter.

DR. F. HURST MAIER.—From the discussion we may infer that there is no time limit and very little physical limit to the removal of ovarian cysts. I was never so much impressed with this as in a case on which I operated two years ago. I was called in to ease the physician in regard to the expected demise of the patient. The patient was seventy-two years of age and had been bed-ridden for eleven months. She was in a sitting posture in bed. She had an enormous ovarian cyst; I do not remember just the amount of fluid present. Her feet were enormously swollen from the pressure edema; the abdomen was also greatly swollen. So far as her kidneys were concerned, however, the urine showed no more casts than in a woman of her age in health with only a trace of albumin. The cardiovascular condition was very good. The family was greatly surprised at my suggestion that she be taken to the hospital for operation and that she would possibly recover. Operation was done removing an enormous glandular cyst of the ovary. This was two years ago and I know she was living some few weeks ago. In regard to the physical limit, I may say that a few months ago I saw a woman of sixty-six years of age with an ovarian cyst of moderate size. This patient had never had less than a blood pressure of 200 during the past two years. Her physician was alarmed on account of the rapid growth of the cyst during the last two months. In this case also there was an illustration of the quick removal of the cyst having no influence upon the physical condition of the patient. She stood the operation well and is, I know, in very good health, except the matter of her blood pressure. I think it is the experience of most operators that neither age nor the physical condition has a deterrent effect in the matter of operation. In cases of malignant tumor with dense adhesions between the cyst wall and the intestines we do not expect good results.

DR. JOHN H. GIRVIN.—A case which I have in the hospital presented one or two interesting features. All agree that cysts in old people are taken out very easily, as a rule, and that the operation of removal is well worth risking. This patient aged seventy years had

a stroke a year ago last April and hemiplegia since then with a blood pressure at time of operation of 195. The patient has been bed-ridden and only within the last two months this cyst began to develop, although the patient believes she has had it for many years. She had not spoken of it before because there were no symptoms. At the time I saw her she had recognized it only about three weeks, but it was growing very rapidly and causing much discomfort. I operated upon her about three weeks ago and she has done very well. The special point at the time of the operation was the fact that this was one of the intraligamentous cysts and it had worked its way down into the broad ligament on the left side and become adherent to the rectum, pushed the peritoneum off the uterus and the sac wall had become adherent to the uterus so that it had to be cut away from it. I had to take a section out of the top of the uterus and draw it together to get the sac away. There have been no bad symptoms but intense pain in the rectum which I attribute to the adhesions.

DR. JOHN W. WEST.—Dr. Hammond's presentation seems to me to emphasize very forcibly three considerations: His first case rather tends to prove the old theological dictum of total depravity; secondly, the duty of being kind to the aged. I think he has fully demonstrated that that is justifiable and proper at all times. The third case I think well illustrates the fallibility of human judgment in the case of cerebral tumor. So far as the question raised by Dr. Hammond is concerned, of what should be done relative to this pregnancy, I believe that the course followed was absolutely correct. I do not believe Dr. Hammond or any one in charge of a similar case has any right to do anything other than to follow the course taken by Dr. Hammond. I rise chiefly to express this opinion.

DR. BARTON COOKE HIRST.—My experience with these cerebral and spinal conditions is that they do not complicate the process of child-bearing nor are they affected by the process, so that I would be inclined to disregard the cerebral or the spinal disease in such a case and treat the case as though that element did not exist. But if I had operated as Dr. Hammond did to save the baby at all costs and disregarded the mother I think I would have done a Cesarean section. I would ask whether the woman developed a high blood pressure or whether any toxemia was present. The convulsions rather pointed to the possibility of a coincident toxemia without any connection with the original cerebral disease.

DR. WILMER KRUSEN.—At the risk of incurring the displeasure of the President by returning to the discussion of the first paper, I may say that some years ago I reported the case of a woman of eighty years of age operated upon for a tumor weighing fifteen pounds. She passed through the abdominal operation without complication except a subsequent Bell's palsy which never disappeared although she lived for five years and died of apoplexy. I saw the case with Dr. Kirkpatrick. In regard to the cerebral tumor case, Dr. Hammond refers to this patient as a "common carrier," which savors more of the language of public service corporations than of obstetric science.

DR. HAMMOND, closing.—In reply to Dr. Hirst's inquiry, this woman's blood pressure was usually about 100; the highest point being 115. In regard to the expression "common carrier" used in the paper I may say it was suggested by a remark by Mr. Hampton L. Carson in citing the case of a pregnant woman traveling on the Great Western Railroad, who suffered an injury in a wreck. When the child was born it was malformed. The husband sued the railroad claiming that the condition of the child was due to an accident sustained by the mother while traveling. The Irish judge in "charging" the jury stated that the railroad acted as a common carrier of the woman but that the woman was the common carrier of the child.

DR. F. HURST MAIER presented a

REPORT OF AN UNUSUAL CONDITION COMPLICATING FIBROID TUMOR  
OF THE UTERUS; PRESSURE ULCER OF THE PERITONEUM OVER  
THE RIGHT ILIAC VEIN WITH EDEMA OF THE RIGHT LEG.

DISCUSSION.

DR. GEORGE ERETY SHOEMAKER.—One might think it surprising that these pressure necroses do not often occur. I think the reason is that the pelvis is funnel shaped upward and as the tumor develops it pushes itself upward. The pressure that we more commonly find is on the ureters which constitutes one of the serious complications of the fibroid. In the case of a vein pressure, collateral circulation takes care of the blood stream. If a tumor fits the pelvis accurately against a ureter there is no collateral channel.

DR. MAIER, closing.—I am sorry that more was not said about the possible cause of this erosion ulcer. Here was a fibroid which was quite movable without sign of inflammation. Up to four weeks ago the patient had been going about with no symptoms with the exception of the edema of the right extremity. The condition was most appalling when I lifted up the tumor in the endeavor to determine the cause of the pressure edema. We had excluded every possible cause. There was nothing in the pelvis to account for it. The uterus was very high. The iliac vessels, uncovered, as they were, appeared ready to rupture. Probably the very movability was the cause of the erosion. I did not notice whether one of the nodules presented right over that surface. If such were the case the constant motion would bring about an erosion. The strange part was that when she was in bed the edema disappeared entirely. Evidently while the tumor was resting upon the lower lumbar vertebræ it did not press upon the vessels, but only when the patient was standing and when there was motion.

DR. WILLIAM R. NICHOLSON.—I would like to ask Dr. Maier whether the microscopic examination of the tumor threw any light upon the case; whether there was any degeneration in the tumor, particularly of that part near the erosion?

DR. MAIER (replying to Dr. Nicholson).—The tumor had not undergone any necrotic change.

DR. BARTON COOKE HIRST read a paper entitled

FIFTEEN YEARS' EXPERIENCE WITH THE INTERMEDIATE OPERATION  
FOR LACERATION OF THE BIRTH CANAL.\*

DR. STRICKER COLES.—The first thought that occurred to me when Dr. Hirst read his paper was that his results must have been very bad during the first ten years; his technic must have been dreadfully poor. I have, of course, tried the intermediate repair but I have gone back again to the immediate repair. I do not say that in every case the result is as good as I want, but it is very seldom that I get a poor result. I could not say exactly how many, but very few of my patients have been to Dr. Hirst or to any other physician for repair of a laceration which had been immediately repaired. I am well satisfied with the method of immediate repair of lacerations. I can show Dr. Hirst cases in my slum work of complete lacerations, one case especially which I took before my class a month afterward, in which it could scarcely be told that the woman had been torn. I am really surprised at the results obtained in that class of work by the immediate repair. I do the immediate operation because personally I am not fond of taking ether or any anesthetic and I make one anesthesia do for my patients. I criticize myself that I go a little bit farther than that; on many occasions I have had patients come to me with such poor results in their repair operation that I have repaired the condition at the second childbirth under the one anesthesia. I have a patient in the hospital now who came to me about two months ago with a rectocele as large as a fist hanging out of the vagina. The woman was confined, and I operated upon her with one anesthesia. Her temperature went over 100 but has since been normal and to-day, six days after operation, she is perfectly well and the stitches are perfectly good. I do not recommend this as a routine procedure but I followed it in this instance because the woman asked me to do it if possible. The result is good so far. The immediate operation in my hands has been very satisfactory. I would like to ask Dr. Hirst whether any of my patients have gone to him; I know of but one whom I sewed up at the time of delivery who has gone to another physician for a secondary operation.

DR. WILMER KRUSEN.—We have listened with the deepest interest to Dr. Hirst's paper and there seems in the third page from the last a covert tendency toward the entire elimination of the gynecologist as a specialist, and so, as a feeble defender of that department of medicine I feel that I must say a word in contradiction of some of his statements. No doubt in the hospitals referred to in which connection he criticizes the hospital management, they have been unfortunate in the selection of the trained gynecologist on their staffs. But I feel that there is still a rôle to be played by the man who trains

\*See original article page 752.

himself to do gynecological work apart from obstetrics. I want to leave this thought: It is hardly fair to ask the obstetrician, tired out by his long hours of watching and waiting for the os to dilate and then performing either version or a difficult forceps operation, to go into the operating room and do the work required at the hands of the gynecologist. It will be unfortunate for the institution, for the medical student and for the patient when the million women in the United States legitimately belonging to the gynecologist shall be taken out of their hands by the obstetrician trained in his peculiar field, but not as well trained as the gynecologist for pelvic work or abdominal surgery.

DR. STEPHEN E. TRACY.—When I first heard Dr. Hirst advocate the intermediate operation for the repair of injuries to the birth canal, I did not think much of the proposition. I am glad to say, however, that I have long since changed my opinion and can confirm everything he has said about the advantages of this procedure. If one will follow up the patients on whom he has done the primary repair, I believe any progressive surgeon will realize that his results are not what they should be. Anyone who has had even a small experience in emergency surgery knows that to suture a lacerated and contused wound is a waste of good material as the majority of the wounds will break down and finally heal by granulation. The same thing pertains to injuries to the birth canal. When I recommend the intermediate repair, I feel just as confident of the result as in the secondary operation. It is a great satisfaction to be able to state to the patient that with the intermediate operation all injuries to the birth canal can be repaired, and the cause for a secondary operation will be eliminated. Granting that occasionally a patient will obtain a good result from the primary repair of the perineum, it is discouraging to learn a few weeks or months later that an operation on the cervix will be necessary to obtain relief from the pelvic discomfort and leucorrhea. How much better it is to wait a few days, repair everything that has been injured, and have it all over with at the one time. The intermediate operation is a little more difficult than the primary or secondary operation, if it be necessary to repair the cervix. The tissues are soft and cannot be pulled down to the same extent. Unless manipulations are made carefully and gently, the cervix may readily be torn to shreds. The slight technical difficulty, however, is no reason why the patient should not have the benefit of this operation. I feel that the intermediate operation is the ideal procedure for hospital work and the better class of private patients, where the surroundings are good, trained assistants and skilful nursing can be obtained. What is the general practitioner to do who looks after the poorer classes of patients with unfavorable surroundings? As long as the majority of specialists continue to advocate the primary operation, he must suture a perineum immediately in order to keep out of legal difficulties. It would be much better for these patients if no sutures were introduced and they were sent to the hospital a few weeks or months later where the proper repair work could be done. They would then not labor under the delusion that

the lacerations had been repaired at the time of delivery and that the discomforts they suffered must be expected. I regret that more of our members have not tried the procedure recommended by Dr. Hirst, as it gives results much superior to those secured by the primary operation. I would like to ask how many have tried the technic outlined by Dr. Hirst for the secondary repair. I do not agree that his technic for the secondary repair should be adopted as a routine procedure any more than I believe any operation should be done as a routine. The character of the operation must be selected to suit the individual patient and not the patient made to suit some particular technic. I am thoroughly convinced that there are some cases in which better results can be secured in the secondary repair by Dr. Hirst's technic than by any other with which I am familiar. If the men who have not tried the intermediate operation will do so on twenty or twenty-five cases and follow up their patients for several months or a year and note the results, I am satisfied that they will not go back to the primary operation.

DR. HANNA.—The difference in the class of cases should be considered in regard to the time of the operation. In a first degree tear I assume that Dr. Hirst would not delay operation and give a secondary anesthetization. With a sphincter tear into the bowel and without the equipment for the repair it would seem to me the intermediate operation would be indicated.

DR. BROOKE M. ANSPACH.—I have been disappointed more than once with the primary operation. I have become convinced that we cannot be sure of the result of a primary operation. The outcome of an intermediate operation is almost invariably good. A very important part of this problem is the prevention of bad peritoneal tears. Many prominent obstetricians think little of episiotomy, but I have been much pleased with it. We all know that a perineum will stretch to a great extent sometimes without a tear, but often a little too much distention is required, and the ligaments or the muscles of the pelvic floor rupture beneath the mucous membrane. This excessive distention may be obviated by an episiotomy incision in one vaginal sulcus. After episiotomy the obstetrician has a clean cut wound to suture, and as the muscles and fascia have not been seriously damaged, the result is almost uniformly good. Episiotomy prevents complete tear of the perineum and extensive submucous injuries which are difficult to diagnose, and still more difficult to treat by any primary form of suture. Episiotomy will enable us to secure good results from primary perineorrhaphy.

DR. GEORGE M. BOYD.—Since Dr. Hirst laid stress upon the advantage of the intermediate operation I have been doing it in a certain proportion of cases. I think, as Dr. Hanna has said, in a very slight tear Dr. Hirst would make an immediate repair for cosmetic effect, closing a gaping wound that might bring about infection. I think he refers to the greater degrees of injury. It would seem ideal to do immediate repair, but we know we do not get satisfactory results in all cases. The question arises whether we shall let the condition alone and etherize the woman two weeks later taking



chances of infection, or doing an immediate operation and taking chances of getting a satisfactory result and if not, making repair later. We do not get good results in the immediate repair on account of the edema and confusion of the tissues. It has always seemed to me, however, that in the intermediate operation we expose the patient to some extent to infection. I agree with Dr. Hirst fully in the matter of the association of the obstetrician and gynecologist. They can no more be separated than can day from night. The two specialties go hand in hand.

DR. MCALISTER.—I agree with Dr. Hirst regarding the advantages of the intermediate repair. I think I heard him explain several years ago that he did the immediate operation because he could not get the patients to remain long enough in the hospital or come back for the intermediate operation. In private practice this difficulty is not encountered. The trouble is that the doctors who do obstetric work are taught to do immediate repair. It is the custom, and if one does it the rest follow suit. If any part of gynecology belongs to obstetrics I think it is the repair of the birth canal. The obstetrician is present when the damage is done and ought to know how to repair it. Whatever is left in the abdominal route might be referred to the gynecologist, but this certainly belongs to the obstetrician.

DR. JOHN A. MCGLINN.—Many questions are suggested in Dr. Hirst's paper, not only concerning the propriety of doing the intermediate operation, but in regard to medical education, obstetrics and gynecology. There is no doubt that the results of the intermediate operation are better than in the primary repair. As does Dr. Anspach, I practise episiotomy frequently and with satisfactory results. As Dr. Hirst has said, probably two million women in the United States are delivered every year and that out of these at least a million torn perineums result. I think, however, that Dr. Hirst does not take into consideration that many of these million women are not primiparæ; they are duplicating their child-bearing. I do not believe for a minute that a million tears occur a year, simply because many of them are multiparous women. It is all right for men in the hospitals or men skilled in this line of work to do the intermediate operation; but a man in general practice confronted with a tear extending into the sulci or cervix, is not trained to do the repair work required; and while I am encouraged to hear how well trained the medical students of the University Hospital are, I have had occasion to note that when they go into another hospital they have not the surgical training which enables them to do good plastic work; nor has the general practitioner, no matter from what institution he comes. An obstetrician, a gynecologist or a surgeon is not made in the medical school. He is a finished product, not possible to be produced in the time spent in the school. There should be in medical education more intensive training rather than the expansive training attempted at the present time. I do not believe that obstetrics should be divorced from gynecology because obstetrics to-day is a surgical procedure; a man does not get his surgical training as an obstetrician but as a gynecologist. It is better for a man

to be a gynecologist first and then an obstetrician rather than an obstetrician first and a poor gynecologist. If he be first a gynecologist he will be a good obstetrician because as a gynecologist he will have learned that the principal factor in obstetrics as in gynecology is the necessity of having a surgically clean conscience.

DR. J. O. ARNOLD.—This is a subject that must greatly interest every practical obstetrician. Some years ago I undertook to obtain, from the viewpoint of the general practitioner, data regarding this question of repair of the birth canal. Replies from a large number of physicians indicated that less than 5 per cent. of those doing obstetric work, do anything else than immediate repair. When it

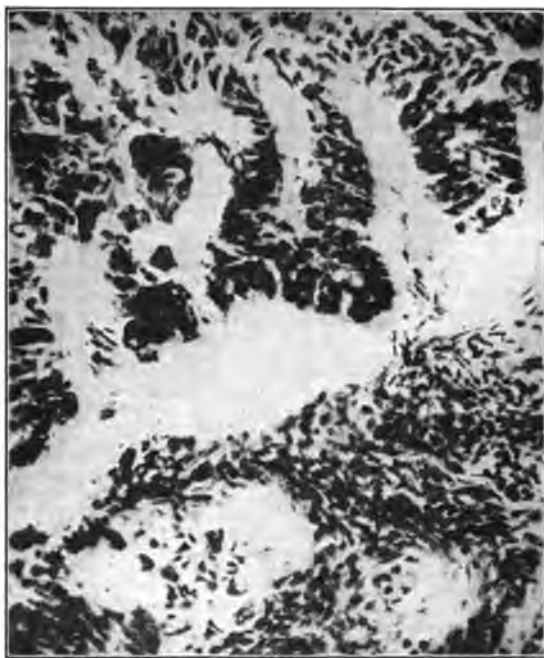


FIG. 1.—Carcinoma of uterus (high power). (Hirst.)

came to the question of results, a very large percentage of those answering could give no definite reply, because they failed to examine their patients at a time when the final results could be known.

In my experience and from my observation of the work of other men I believe immediate repair is often very faulty in its results. I am coming more and more to believe that the ideal treatment is that described by Dr. Hirst. Yet I know full well that under the conditions which the general practitioner is obliged to meet at the present day, this ideal method cannot be generally practised. We must, however, look forward to such a possibility and try to improve upon the present conditions.

I think Dr. Anspach touched a vital point in recommending episiotomy for the avoidance of many of these tears. I find I am resorting to this procedure with increasing frequency and with very satisfactory results. I believe that it helps us to avoid not only the inevitable and visible tears but the equally serious submucous injuries that so often result where the prolonged efforts to prevent lacerations have *appeared* to be successful.

If we were to devote a little more time to this very practical problem of preventing lacerations, it would perhaps be just as profitable as the discussion of ways and means for bringing the obstetricians and the gynecologists together in a love feast.



FIG. 2.—Adenocarcinoma of uterus (low power); villous extensions upward. (Hirst.)

DR. HIRST, closing.—I have been very much interested in the various views expressed. My friend Dr. Krusen reminds me of Mauriceau and the 18th Century. His remarks have a suggestion of knee breeches, wigs and gold-headed canes. He evidently does not know the way we conduct labors at the present time. We do not sit by a patient's bed for twenty-four hours but have a room and bath with a valet at our disposal and leave word that we shall be called only when we are needed. We don't do hard forceps operations any more; they have gone out. We do Cesarean sections if the head is not engaged and will not engage in the pelvis, and after any of these

performances are as fresh for our work as any surgeon after an emergency operation.

Regarding Dr. Coles' remarks that he can get uniformly satisfactory results from the primary operation—if I were a betting man, I would wager him any amount of money that an impartial examination of the results of the primary operation in 100 successive cases would show a percentage of about 25 that ought to be operated on again. I am paying Dr. Coles a well-merited compliment, in assign-



FIG. 3.—Carcimoma of appendix (high power).  
(Hirst.)

ing him only 25 per cent. of failures. My percentage was greater: more like 40 or 50 per cent.

Regarding episiotomy I would like to point out to the advocates of this operation that it does not save the pelvic floor as much as they seem to think. A careful examination of the pelvic floor at once or a week later will reveal injury of the levator ani muscle, the deep transversus and the triangular ligament, and it would be discovered that the destruction of the pelvic floor was not avoided. Another disadvantage is that this operation deprives these regions of their normal elasticity. On the other hand, a proper plastic



FIG. 4.—Carcinoma of appendix (low power). (*Hirst.*)



FIG. 5.—Sarcoma of uterus (high power). (*Hirst.*)

operation restores the parts to exactly the same condition they were in before delivery.

Regarding injuries of the first and second degree and whether I would subject patients to a second anesthetization for the repair of these. Here the question is not so much one of repair as of diagnosis. Our President was present recently in the hospital when I delivered a woman with forceps with only a slight perineal tear, and as a matter of principle and because he was looking on, I refused to do the primary operation. In doing the intermediate operation I found that the injury was much more extensive than appeared at the time of delivery. It is, therefore, the diagnosis that counts in these apparently slight tears. I cannot make an exact diagnosis of the amount of tear immediately after delivery nor can anyone else. There may, of course, be a few cases in which one can be absolutely certain that the tear is slight and in such cases I do a primary repair.

DR. GEORGE ERETY SHOEMAKER read a paper entitled

SURGICAL TRAUMATISM A CAUSE OF RECURRENCE IN CARCINOMA OF THE UTERUS.\*

DR. BARTON COOKE HIRST presented an

EXHIBITION OF SPECIMENS ILLUSTRATING THE COINCIDENCE OF SARCOMA AND CARCINOMA OF THE UTERUS, AND CARCINOMA OF THE APPENDIX.

DR. BARTON COOKE HIRST.—These conditions are so rare that they are well worth adding to our transactions. In the case of a woman of fifty in whom carcinoma and sarcoma were present, the large soft mass projecting from the cervix was first diagnosed as sarcoma. Examination of the gross specimen after removal of the uterus showed that carcinoma was also present.

The second case was that of a young woman with a dermoid cyst and twisted pedicle in whom I found at the time of operation a curious nodule on the end of the appendix. Naturally I added an appendectomy to the cystectomy. The laboratory report on the growth at the end of the appendix was carcinoma of the appendix. In looking up Kelley's monograph on the appendix I find that carcinoma is a rare condition there being as I recall it but thirty cases on record at the time the book was written. With the permission of the Chair I should like to ask Dr. Weidman to exhibit slides made from the specimens. Both patients made a satisfactory recovery from the operation.

\* See original article page 758.



FIG. 6.—Sarcoma of uterus (low power). The darker perpendicular streaks are the most richly sarcomatous parts. (*Hirst.*)

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## TRANSACTIONS OF THE BROOKLYN GYNE- COLOGICAL SOCIETY.

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*Meeting of December 1, 1916.*

*The President, CLARENCE R. HYDE, M. D., in the Chair.*

DR. GORDON GIBSON, reported a case of

### HYDROPS OF THE GALL-BLADDER.

This specimen is of interest for two reasons, the pathology and the treatment. The patient was a woman, thirty-seven years old, who came to the Polhemus Clinic complaining of backache, pain in the pelvis, dysmenorrhea and leukorrhea. She had been married ten years, had had three spontaneous labors with normal puerperia, the last six years ago. Her complaints date from a miscarriage four years ago at which time she was infected. She remained in bed four weeks and the result of this process was a scar in each broad ligament. Examination also showed a laceration of the perineum, a marked

bilateral laceration of the cervix with a good deal of eversion, erosion and hyperplasia, and retroversion. The patient was a stout woman and examination of the abdomen was rather difficult, however a nontender mass was indefinitely felt in the right side just under the costal margin. This was taken for a movable kidney because of the lack of tenderness and the absence of any history of trouble in the upper abdomen. She was sent to the hospital and on Nov. 11 the cervix and perineum were repaired and the abdomen opened. Exploration disclosed this large, distended, thin-walled gall-bladder with a stone in the ampulla. The uterus was suspended and the appendix, which was slightly diseased, was removed. A transverse, epigastric incision was then made, the gall-bladder removed in the usual way and the wound was closed without drainage.

This gall-bladder is 6 inches long with a circumference of 7 inches around the middle. It has very thin walls and contains a clear serous fluid. It is evidently the end result of a mild inflammatory process induced by this medium-sized stone which had become lodged in the ampulla. There were a few adhesions about the ducts.

As to the treatment; I have always felt that it was unnecessary to drain when a cholecystectomy was done in the absence of any active inflammation, and when one can split the peritoneum before ligating the duct and artery separately. It is the usual thing to find when drainage is done, in this type of case, to find on withdrawing the drain that there has been nothing to drain.

The transverse epigastric incision was described by Meyer in the *Annals of Surgery* for November, 1915. It has several advantages in that it gives easy exposure of the ducts, is easy to close and hernia is infrequent.

DR. RALPH POMEROY showed

#### TWO UNUSUAL SPECIMENS OF UTERI.

The tumors are not of the usual type; not fibroids. The first specimen was removed from a patient fifty-three years of age, a parous woman who had started to bleed after the menopause. The uterus was felt symmetrically enlarged and the bleeding was from the cervix, though the cervix did not present any abnormality. We sutured the cervix with black silk and then did an abdominal hysterectomy. The pathologist reports the specimen as a spindle-celled sarcoma. The patient made an uneventful recovery. The second specimen has more interesting clinical features. This patient was sixty years of age. I saw her last March for the first time, when I found a slightly enlarged uterus with flow; she was an old maid with a senile vagina. I was sure she had a carcinoma of the body and urged operative procedure. She promptly disappeared and went to the country, and neither her family physician nor I saw anything of her until two months ago. Examination at this time showed a necrotic, infected condition, temperature 104°, with a foul discharge from the vagina, which was washed out with a 1 per cent. solution of formalin and a rectal tube was passed up into the uterus and left there



for ten days, the solution being injected once a day. At the end of ten days the discharge stopped, the temperature dropped to  $99\frac{1}{2}^{\circ}$  and I was able to go up and examine further. The abdominal tumor was enlarging rapidly. I did an abdominal hysterectomy under great difficulty, the uterus was attached to the intestines, but I managed to get through with the operation. The patient did not go back to the ward. The tumor was a colloid carcinoma. The interesting feature is that when the patient came into the hospital she was absolutely inoperable but was made operable by drainage.

#### DISCUSSION.

DR. POLAK.—In our sway toward ultraconservatism, I think perhaps some of us have lost sight of this method of drainage of retained discharges within the uterus, which originated with Coroso some years ago. The credit of the clinical development of this method belongs to Ill. With the permission of Dr. Schwartz, I will report a case in our service, in which he did an anterior hysterotomy and delivered a six months fetus. He then repaired the anterior uterine wall and incision through the cervix. He would not have done the operation had he known that the case had been handled outside of the hospital. The patient developed an infection. We followed out conservative methods, yet the patient had rises of temperature and chills. On examination, we found a long, small cervical canal, and a relatively large body. The cervix was dilated and a rectal tube inserted, to the fundus, and the cavity about the tube loosely packed with iodoform gauze, the ends of which were brought out into the vagina. A funnel was attached to the intra-uterine tube, and 8 ounces of a 70 per cent. alcohol solution was given from time to time, through this rectal tube into the uterus. The gauze packing about the tube thus became saturated with the alcohol solution. This stimulates better retraction and increases the resistance of the protective zone. The patient's temperature immediately came down to normal, the chills ceased and recovery followed. There are a certain number of these cases due to absorption from defective drainage, which can be relieved by a rational procedure, as suggested by the case of Dr. Pomeroy.

DR. COMMISKEY presented a specimen of

#### DOUBLE MONSTER.

These are derived from one ovum and are developed from one germinal vesicle. Two embryonal areas appearing the possibilities are: two complete individuals of the same sex (homologous twins), when the division of the areas is complete or united twins when the embryonal areas are not completely separated. This monster is of the latter type, incomplete separation of the two areas. The point of union of the twins depends upon whether the division of the two is from above downward or the reverse as in the specimen presented. You should, therefore, call this a double monster of the *terata amadidyma* type.

The other interesting factors here concerned are the possibilities of presentation in such a fetus and the likelihood of distocia resulting from such abnormalities; fortunately in this instance the vertex presented and spontaneous delivery resulted.



FIG. 1.—Double Monster. (*Comminsky.*)

DR. POLAK reported a case of

#### PYOCOLPOS.

"This woman was referred to me because of difficulty in copulation. On examination, I found the vagina not patent. Just behind the hymenial opening was an atresia due to a cicatrix, completely closing the vagina. By a rectal examination we found a distended vaginal tube and an enlarged uterus, which we recognized as a two and one-half months' pregnancy. There was a rectovaginal fistula which some one had made in attempting to find a point of entrance. There had been an amenorrhea of about three months. There was a history of periodic bleeding from the vagina prior to marriage, but an inability to consummate the union. I missed the point of the case but a student discovered it for me. In going into the detailed history, he found that when the husband had attempted an entrance, she had bled so freely that a physician was called, who packed her, and fever had followed. I deduced the theory that she must have had some patency and had received an injury from which a cicatricial vaginal atresia had followed. When she came in for operation and exploration, we put the sound into the urethra, just as one would in following the anterior wall to isolate the bladder. After freeing the bladder, we found a fluid mass posterior to our dissection, so we drove boldly in and found the pyocolpos. The pregnancy had

caused an amenorrhea and a granular cervicitis with its resulting accumulations. We made flaps, put in a Sims's glass plug, and packed. She had gotten pregnant through what was apparently an extremely small opening. We carried a piece of gauze soaked in carbolic, through the fistula, and placed a tube in the rectum, which ran past the fistula, and the fistula healed up. This procedure was suggested by Dr. Hyde."

DR. FRANK H. KNIGHT read a paper entitled:

ANATOMICALLY SHORTENED ROUND LIGAMENTS.

"The subject of uterine displacement has been so frequently and completely gone over that I have hesitated very much, calling your attention to this subject again, but will be brief in my remarks, as

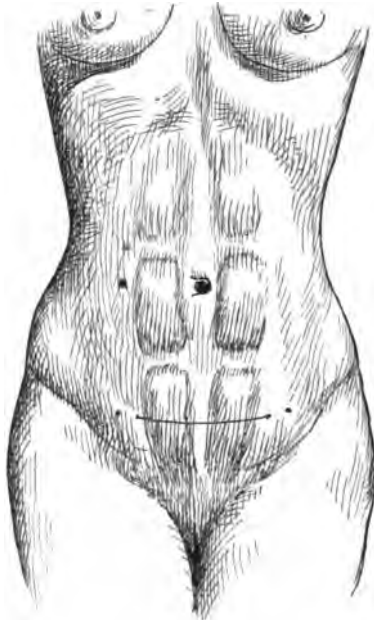


FIG. 1.

there are but two points in particular to which I desire to call your attention to-night.

"The first is the apparent inefficiency and indifference of the obstetrician toward the after-care of the parturient, with backward displacement as a result.

"The second is a simple surgical procedure by which the round ligaments may be shortened in the process of correcting backward displacement of the fundus uteri.

"In one of my clinics where an opportunity is offered for the observation of a large number of patients suffering from symptoms

referable directly or indirectly to the backward displacement of the uterus, we found that the majority traced the onset of their trouble to a confinement. Practically 100 per cent. of these cases were never instructed regarding corrective positions during the latter days of their puerperium. Many were never examined at any time after their labor and a large percentage were allowed to leave their beds before it was possible for involution to be complete. It, therefore, appears that if the obstetricians will make more careful

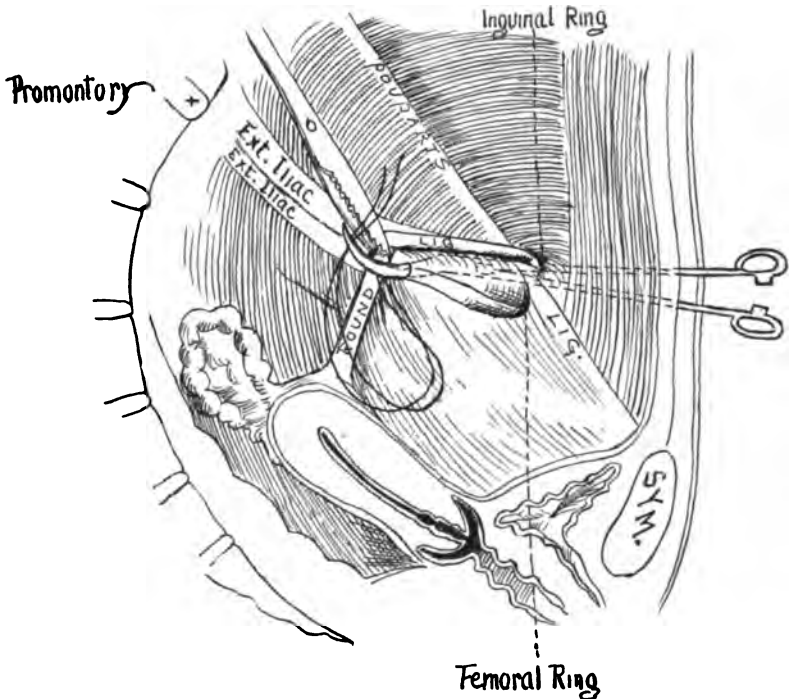


FIG. 2.

supervision of their patients during and immediately following the puerperium, and avail themselves of at least the prone position and the pessary properly placed, the maternal morbidity and the number of backward displacements seen by the gynecologists will be materially reduced.

"The surgical treatment of backward displacement which I wish to present to you, deals with the round ligaments only, and although I fully appreciate there may be other factors in relation to the displacement which require readjustments, it is my purpose at present to present to you a simple and efficient method of shortening these ligaments and giving the fundus a support in an anatomical manner.

"The accompanying diagrams will serve to illustrate the various steps of the operation.

"The Pfannenstiel incision is best utilized, for, by extending this incision laterally as far as may be required to give easy access to the region of the internal inguinal ring, it will obviate the necessity of forcible retraction of the skin and fat otherwise necessary in a vertical incision and thereby minimize the tissue damage and the consequent danger of infection.

"Having entered the peritoneal cavity, complications may be dealt with, and the round ligaments are ligated 3 or 4 cm. from the uterus.

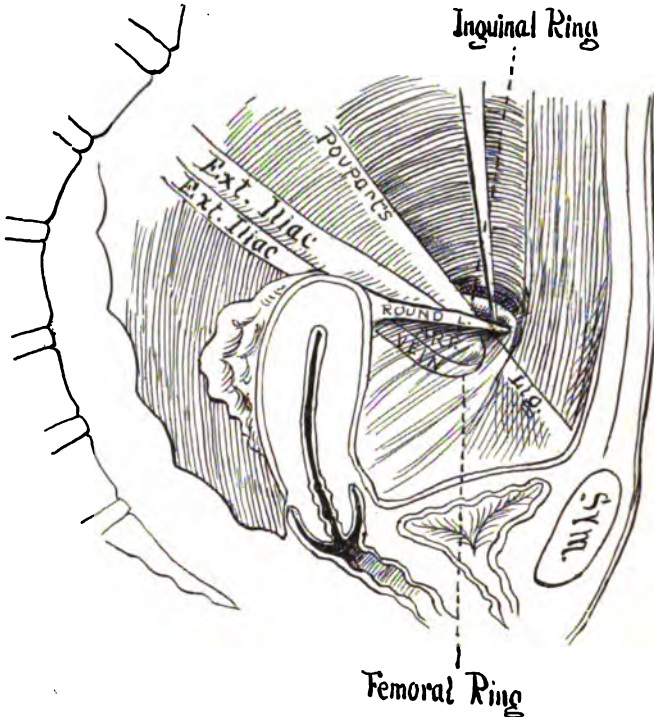


FIG. 3.

Next a large Cleveland ligature carrier is thrust through the external oblique aponeurosis, immediately anterior to the internal inguinal ring, then through the ring, and carried along the round ligament between the layers of the broad ligament to a point immediately below the ligature on the round ligament; here it is thrust through the anterior layer of the broad ligament, the ligature grasped and drawn out in the reverse manner dragging a loop of the round ligament with it until the ligament emerges on the anterior surface of the external oblique. The same procedure is carried out on the opposite side and the normal position of the fundus restored by a sufficient amount of tension upon both ligaments. The redundant loops of ligaments are now turned downward and firmly sutured in a fold of external oblique aponeurosis.

"Though this operation should never be performed where there is marked subinvolution or where the round ligaments are considerably atrophied, it has a large sphere of usefulness, provided other complications are cared for, should they exist."

The advantages of this operation are obvious:

In the first place, the peritoneal cavity is opened, which allows thorough inspection of the pelvis and the repair of any complications.

In the second place, the pull of the round ligaments is over a firm pulley made by the edge of the external oblique aponeurosis and the

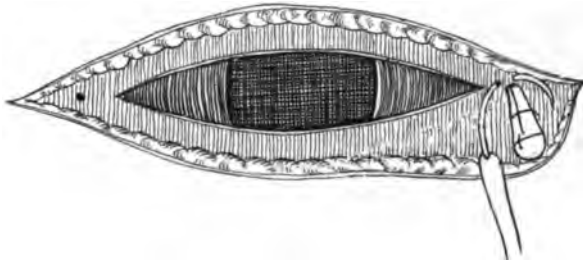


FIG. 4.

margin of the internal inguinal ring, thus giving a firm support and in an anatomical direction.

In the third place, the strong proximal ends of the round ligaments are utilized for support.

In the fourth place, no loops for internal herniæ or raw peritoneal surfaces, upon which adhesions may form, are produced.

In the fifth place, neither pregnancy nor involution is interfered with.

#### DISCUSSION.

DR. POLAK.—Dr. Knight's graphic presentation looks very much like a modification of the Simpson operation, which I have understood from Dr. Simpson, is bringing the ligaments through an extraperitoneal fold and on to the external oblique, and suturing them to the aponeurosis of the external oblique. Gilliam's operation was the first to bring the loop of ligament through the abdominal wall. Ferguson modified this, then Montgomery developed his needle, and Simpson his forceps, to bring out the ligament without leaving extraperitoneal bands. The trauma to the tissues Montgomery tried to obviate by the invention of his needle, as did Simpson by his forceps. The Alexander operation is ideal in a certain number of cases, but we know that no two women have the same kind of round ligaments. The objection to all the sling operations, is the test of pregnancy. When the uterus is slung by its face, there is the disadvantage where there is a heavy uterus, and when there are unequal ligaments, it is apt not to bear pregnancy, and tends to retrovert. We started a new end-result study two years ago, and

our results with a number of Gilliams show that 40 per cent. were followed by retroversions after pregnancy. So far as our observation goes, the operation that stands pregnancy best is the Webster-Baldy operation.

DR. HUMPHSTONE.—I would emphasize the necessity for great care of these cases after confinement. We now treat them by placing them on their faces for a time and after they get up we put in a sterile pessary to lift up the uterus; two or three applications of the pessary will sometimes cause the uterus to go forward. I am free to express the opinion that the Gilliam operation is the best.

DR. BECK.—We follow up these cases fairly well in our postpartum clinic, and I believe Dr. Knight is right in advising care in the postpartum period. You all know the kangaroo walk. I have collected eighty-five cases and a little less than 10 per cent. had retroversion after the use of this method of exercise.

DR. HOLDEN.—If Dr. Simpson were here I believe he would take issue with Dr. Polak. He published his operation prior to that of Dr. Montgomery. I cannot see where Dr. Knight's operation differs from the Simpson operation, but we should be glad to have any man bring this subject up before the Society. I believe with the use of posture treatment, exercises, tonics, pessaries, and tampons, recurrences should not be frequent. Dr. Polak speaks of recurrence after operation. It is hardly square to put the blame on the operation, it should be placed on the lack of care after the operation and not on the pregnancy, when failure occurs.

DR. KNIGHT said that if his operation were examined in detail it would be found to be quite a little variation from the Simpson. Patients should be treated by the use of a pessary after the operation.

DR. DONALD S. MACNAUGHTON read the report of two cases of

#### DOUBLE UTERUS COMPLICATING LABOR.

The malformations of the uterus, although of comparatively rare occurrence, are of importance because of the large number of pathological conditions which are produced by these anomalies of development.

At the fourth to sixth week of intrauterine life the ducts of Müller form, and approaching each other unite at about the sixth to eighth week, the lower third of the ducts forming the vagina, the middle third the uterus, and the upper third the tubes.

When for any reason the ducts fail to unite, or develop properly we have the various anomalies, the uterus didelphys representing complete nonunion, while the uterus septus is the type most nearly approaching the normal. Between these two extremes all varieties may be found, depending on the amount of development and union of the ducts.

The following cases occurred on the Obstetrical Service of the Kings County Hospital. The summarized history is as follows:

CASE I.—M. B., admitted July 4, 1916; aged twenty-one. Married one year, no previous pregnancy. Last regular menstruation February 5. Bleeding for one day on March 6. On July 4 had abdominal pain and vaginal bleeding considerable in amount.

*Examination.*—Patient looks pale. Pulse 80. The abdomen is enlarged slightly above the umbilicus. Fetal heart heard in right lower quadrant, rate 160.

Vaginal examination disclosed two vaginae about equal in size, with a thick septum extending to the cervix. At the upper end of the vagina a communication the size of a finger existed connecting the two vaginae. Two cervices, each admitting one finger but un-effaced. Right vaginal examination showed portions of placental tissue in the vagina, and also within the cervix, with considerable hemorrhage. Left vaginal examination showed unruptured membranes and unengaged head.

The two uterine bodies were not at this time diagnosed, and it was believed that the placental tissue felt constituted a placenta previa in a uterus subseptus unicorporeus. Because there had been but two hospital examinations, no temperature, free bleeding, unprepared cervix, with the added complication of a double cervix, it was thought advisable to do an abdominal hysterotomy.

On opening the abdomen two distinct uteri presented, united only at their cervices, each having one tube and one ovary. Left uterus pregnant about six months, right half appeared pregnant about four months. Child was removed from the left uterus by median incision of that organ and the wound sutured in the usual manner. Child was stillborn, weight 2 pounds 1 ounce.

The patient was now placed in the lithotomy position and the right uterus pulled down to the introitus, the cervix dilated, and a large amount of placental tissue removed. No fetus was found, it having evidently been previously expelled.

Convalescence was uneventful.

CASE II.—A. M., aged thirty-two. Admitted September 13, 1916. Previous history unimportant. Began to menstruate at twelve, regular, last three to four days, very little pain. Date of last period not known. Married five years. Three previous pregnancies, all aborting at three months. Wassermann negative. Patient admitted to hospital in labor, having been in labor for several hours.

*Examination.*—Uterus appears on the left side of abdomen reaching almost to ensiform. Fetal heart in left lower quadrant rate 140. Vaginal examination. Two vaginae about equal in size, formed by a septum extending to the cervix. Posterior to the cervix the two vaginae communicated by means of a small opening. A cervix was felt on each side of the septum. On examination of the left cervix it was found to be dilated three fingers, membranes unruptured, head prevented from engaging by nodular right uterus which was situated posteriorly, and could not be pushed up. The mass lay in front of the sacral promontory, shortening the diameter of the inlet.

*Operation.*—Abdominal section. Two distinct uteri united only at the cervices, each having one tube and ovary. Left uterus pregnant nine months. The right uterus, which was studded with fibroids, was displaced backward preventing the head from engagement. Child removed from left uterus by median incision and uterus sutured in the usual manner. A small fibroid was removed from this uterus. The right uterus showing many fibroids accom-



panied by malposition was then removed by supravaginal hysterectomy and the round ligament attached to the stump.

Convalescence of mother and child were uneventful.

The questions which would naturally arise in cases having double uterus would be: 1. Fecundity. 2. Pathological states produced in the nulliparous condition. 3. Complications during pregnancy, and 4. During labor.

Gile analyzed twenty-one cases occurring between 1875 and 1900. He found that of fifteen married 93 per cent. became pregnant. The probability of pregnancy should a woman with this anomaly wish to marry is therefore good.

2. The conditions produced by the various types of maldevelopment in the nonpregnant are mostly concerned with the question of drainage. Should the egress of menstrual blood be interfered with by imperforate cervix or vagina we have the development of hematometra, or if infected, pyometra. There also seems to be rather a high incidence of fibroids reported in connection with double uterus.

3. It is in the pregnant state that the double uterus becomes the greatest menace. Should pregnancy occur in a rudimentary horn we have a condition simulating ectopic, excepting the fact that it is much more dangerous. According to Kehrer spontaneous rupture is most apt to occur at the fourth month. The treatment of this condition is always removal of the pregnant horn.

4. During labor one of the most frequent complications is obstruction by the unimpregnated half.

In twenty-six collected cases including eleven of Giles there resulted fifty-five pregnancies, forty-two or 76 per cent. of which resulted in living or viable children. Thirteen or 23 per cent. miscarried. Ten or 18 per cent. of the cases were operative. The prognosis in cases of double uterus is, therefore, fair as to the probability of a normal labor, in fact much better than might be expected, and it would appear that the anomaly does not call for any radical treatment of the condition itself. The double uterus comparatively rarely becomes the seat of double pregnancy, and the vaginal septum which accompanies this condition in 67 per cent. of the cases and is, therefore, a very important aid in the diagnosis, does not usually give rise to complications, being merely displaced to one side by the engaging part.

#### DISCUSSION.

DR. BEACH.—I believe the writers should be more careful in the use of the term double uterus and in mentioning a case should be careful in describing the type. A case was operated upon at the Jewish Hospital two years ago, at which time the appendix was removed; it was a bicornate uterus. This woman became pregnant some time later and was sent into the hospital when she was examined by Dr. Polak and myself. We found a full-term baby and the enlargement was to the right of the abdomen. The meconium had escaped. We discovered that it was a breach apparently pushing

the vaginal wall in front of it; we could not find the right side of the uterus. I had intended doing a hysterectomy but did a Cesarean section. The patient was in such a state of shock that we were prevented from doing a further operation, and the difficulties of drainage also made it doubtful. The patient had almost no lochia but after several days there were a few clots and free blood. She made a good recovery. I saw another case at the Methodist Hospital about eight months ago in a patient who was eclamptic. She had a double vagina with one cervical canal. Dr. Pomeroy saw the case and was very encouraging; said she was going to die anyway. The difficulty was with the septum in the vagina. The pregnancy was on the right side with a rudimentary uterus on the left side. I did an abdominal section and delivered the baby. We were so busy with the eclamptic condition for three days that we did not look into the drainage, but there was little or none, some discharge of blood. The patient developed a dilated heart, pulmonary edema, general anasarca, and died. The autopsy showed that the canal on the right side of the uterus was about 2 inches long and admitted only a probe. The suture line had opened up and there was some peritonitis. The point regarding fibroids is interesting. Peek believes that double uterus is formed by the interposition of foreign tissue cells which are going to develop later in an abnormal manner; he reported a case where a fibroid was located between the horns of a bicornate uterus.

DR. POLAK.—One point regarding the nonpregnant woman with a double uterus. We have seen little or no trouble in such cases until the woman marries, but from the time of her marriage, she complains of a definite symptomatology, usually metrorrhagia. I do not know how to account for it, but it is a clinical fact, that a large proportion of cases of uterus didelphys and bicornate uterus are of no clinical account until marriage, in that they produce no changes in the woman's menstrual life. It little matters whether or not the woman becomes pregnant. Marriage seems to disturb the menstrual life. Another point is, whether we should operate if they are not pregnant. In a very excellent paper read before the International Congress in London, Kerr showed the procedure of removing one-half, the rudimentary horn, of the uterus didelphys. In a series of cases where such amputation was done, the results showed that pregnancy was more favorable. In these cases, if a pregnancy is allowed to go on to term, they will often deliver themselves spontaneously. I have seen six cases in consultation, in which Cesarean was done, and they have all had defective drainage. If section is necessary, it should be followed by hysterectomy.

DR. HUMPHSTONE.—At the Methodist Hospital recently I saw a case of didelphys in which there were two bodies above the cervix. There were two vaginae and the septum interfered with the delivery. Removal of the septum allowed the woman to be delivered.

DR. ALFRED W. WHITE in discussion presented a case of  
DOUBLE UTERUS COMPLICATING LABOR, CESAREAN SECTION FOLLOWED  
BY ACUTE DILATATION OF THE STOMACH AND DEATH.

Mrs. M. P., aged twenty-eight years, Italian.

Previous history, had measles when a child, otherwise always in good health.

Family history of no interest.

Menstrual history: Menstruation first appeared at the twelfth year, always regular, up to two years ago, appearing every twenty-eight days and lasting four or five days. Three years ago patient aborted spontaneously at two months, recovery uneventful. Two years ago she aborted at three months, this abortion was evidently incomplete since patient was curetted. Since this second abortion the patient has flowed every ten days for a period of three or four days. The last showing was on July 25, 1915.

The patient was admitted to St. John's Hospital on May 2, 1916, in labor. I was first asked to see the patient on the afternoon of May 5, 1916, to determine why the presenting part had not engaged, the patient having been in labor since midnight, May 1.

The patient was a large, well-nourished and well-developed woman and her general condition was good considering the length of time she had been in labor. Temperature 98.4, pulse 100, respirations 20. On abdominal examination the only unusual finding, aside from the fact that she was pregnant at term, was a large hard mass in the lower left quadrant. On vaginal examination the vagina was found to be divided into two parts by a thick fold of tissue extending from the introitus to a cervix on either side. In the right vagina, at the brim of the pelvis, was felt a cervix dilated two fingers, membranes intact and a breech in the right anterior position presenting. In the left vagina, just below the brim of the pelvis, was felt a hard undilated cervix, which was attached to the mass in the lower left quadrant of the abdomen. A sound was inserted into this left uterus to a depth of 6 inches. With each contraction of the right impregnated uterus, the cervix and lower portion of the left, unimpregnated uterus, was forced down into the pelvis.

Cesarean section was advised and performed without any unusual occurrence.

Postoperative history. Following operation the patient spent a very restless night. She vomited about 2 ounces of a clear fluid once during the night. The following morning she complained of acute pain over the region of the stomach and vomited small amounts of greenish fluid several times. Her temperature was 98.4, pulse 140 and respirations 40. On abdominal examination the stomach was found to be distended, forming a large tumor below the free border of the ribs and extending down to the umbilicus. A stomach tube was passed and large amounts of gas were expelled through it, with a very appreciable diminution in the size of the tumor. The stomach was then washed with saline and an ounce of magnesium sulphate put into the stomach. This was followed

by a colonic irrigation and later by a Murphy drip. Following this treatment the patient slept for several hours and said upon awaking that she felt perfectly comfortable. Later in the day the same symptoms reappeared and the same procedure was followed with like results. This state of affairs went on until the patient died on May 9, four days following operation, each attack being relieved by the stomach tube, and with each recurrence the stomach becoming more distended.

The patient took some nourishment, her bowels moved freely and she voided urine. She never vomited after the first twelve hours following operation; but in spite of all that we could do she became gradually worse, the pulse increasing until it reached 156, the temperature 106 and the respirations 50.

A postmortem was unobtainable.

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*Meeting of January 5, 1917.*

*The President, DR. CLARENCE R. HYDE, in the Chair.*

DR. HENRY M. MILLS presented a specimen of

CARCINOMA OF THE OVARY.

This specimen was removed from an English woman, forty-seven years of age, who was referred to the gynecological service of the Kings County Hospital with a diagnosis of possible carcinoma of the cervix. Upon examination the cervix was found to be very much hypertrophied and had a long unilateral laceration, with ectropion of the mucous membrane which was studded with Nabothian cysts. The uterus was freely movable, the right ovary prolapsed, hard and enlarged. A specimen of the cervix sent to the laboratory to be examined was reported negative. The operation consisted of a Sturmdorf amputation of the cervix and removal of the ovary through a right rectus incision. During her convalescence she vomited on one occasion and a specimen of the vomitus was sent to the laboratory. Occult blood was reported present. Cancer of the stomach was suspected but her symptoms were not very pronounced. Two months later she was admitted to the German Hospital where they found at operation carcinoma of the stomach. She died three weeks later. I judge this specimen is not a primary carcinoma of the ovary, but probably secondary to the stomach carcinoma.

The pathologist's report states that the specimen consists of an ovary measuring  $5 \times 5 \times 4$  cm., whitish in color and shows several nodules of a large size. On section it is seen to be made up of a whitish tissue having a fibrous appearance in some places, while at other points small oval masses are noted. At one end a small simple cyst is seen. Sections show only a small area of normal ovarian tissue which is located at the margin. The remainder of the mass is made up of atypical epithelial cells of varying size. At

many points attempts at gland formation are seen. Many mitotic figures are present. Diagnosis: Carcinoma.

DR. MILLS also presented a specimen of

#### ADENOCARCINOMA OF THE UTERUS.

This woman was forty-five years of age, the mother of eleven children, three of whom had been delivered by Cesarean section, the youngest child two years old. She came to hospital for uterine bleeding. On examination the uterus was found to be in normal position, freely movable, smooth, no nodules, not very tender, some tenderness in the right ovarian region. On account of age and bleeding adenocarcinoma was suspected. Diagnostic curettage was performed and the specimen submitted to the laboratory. The report was doubtful. As the bleeding persisted notwithstanding the curettage, the abdomen was opened and a small ovarian cyst was found to be present. On account of the laboratory report it was judged best to remove the uterus also. The operation was performed October 23, 1916. This specimen is of interest because of the three Cesarean sections which had been performed, and it will be noted that the cicatrices are hardly visible, the parts being securely healed. It does not seem possible that these scars would rupture in the case of pregnancy, this being the danger after Cesarean section.

#### DISCUSSION.

DR. McNAMARA.—I happened to see the specimen when it was removed and it was remarkable to see the efforts of nature to take care of the scar. One could not say surely that the uterus had ever been opened. It would be interesting to know what method had been used and the kind of suture.

DR. HOLDEN.—In the first case cited by Dr. Mills it seems to me that the patient had not received proper preoperative study. It is hardly right to operate on a patient for a carcinoma of the ovary when she had a primary carcinoma somewhere else. The case was not properly worked up. I believe we do not have enough preoperative study of our patients before operation.

DR. McNAMARA.—I think Dr. Holden wants to lead us all into a Utopian condition of hospital service, something that will never exist. It is undoubtedly true that very few cases are ever sufficiently gone over that the conditions are all perfectly recorded, nor is it advisable or practicable always to do it. Is it fair to hold us up to a standard we are unable to live up to? The fact that this woman had a latent condition in the stomach without symptoms should not be held against a surgeon. The symptoms found were sufficiently diagnostic to warrant the operation. I believe carcinoma of the stomach and adjacent organs is very difficult to discover.

DR. BISHOP.—I remember a case of a woman five years beyond the menopause who began to flow. She went to a dispensary where she was treated with a pessary. She then went to a woman doctor who specializes in rectal irrigation but when she flowed profusely the

woman doctor refused to go to see her. She was referred to me and examination showed an apparent fibroid and I suspected malignant degeneration, the mass reaching almost up to the navel. Upon operation it was found to be an enlarged ovary almost the size of a fetal head which was diagnosed as a primary carcinoma of the ovary. In answer to Dr. Holden, it is only fair to say many patients refuse to submit to the modern methods of diagnosis, they want medicine.

DR. MILLS.—I expected criticism and I am glad the cases have created interest. This woman suffered from dyspepsia but the chief symptoms were in the lower part of the abdomen. While in the hospital her stomach emptied itself well. At the German Hospital they did not find the disease of the stomach until they operated. I agree with Dr. Holden that we should have better preoperative examinations.

DR. TAYLOR.—I saw a case recently in Philadelphia at Dr. Deaver's clinic which may be of interest, a carcinoma of the breast in a man. I had never heard of a case until this operation. Dr. Deaver, in operating made a complete excision from the acromian process down to the costal cartilages and cleared out the axillary glands also those at the side of the chest along edge of latissimus dorsi. In the course of an hour while other cases were being operated upon the report came back from the pathological laboratory that the glands were not infected but that there was no doubt of the breast condition. Carcinoma of the male breast is exceedingly rare.

DR. EARL H. MAYNE read a paper on

#### PERFORATION OF THE UTERUS THROUGH THE USE OF INSTRUMENTS, WITH CASE REPORTS.

Just how frequently this accident occurs, it is hard to determine with any degree of accuracy, many cases, especially those happening in private practice, not being reported. In hospital practice more exact statistics may be secured.

In the Coney Island Hospital, from its opening in May 1910, to December 31, 1916 only three cases have been observed, the total number of cases admitted to the gynecological and obstetrical services having been approximately two thousand.

In the Cook County Hospital, Chicago, during a period of five years, three cases of perforation were noted among 495 abortions and 2343 pregnancies cared for during that time.

A diligent search of the medical literature from 1895 to 1907 by Heineck yielded 160 cases; from 1911 to 1915 inclusive Schwietzer was able to find 105 cases reported.

The type of case referred to in these reports is that produced by instruments introduced through the cervical canal. The uterus is often perforated in the operation for cancer by the heat method. Such accidents are not unexpected and are often necessary for thorough destruction of the growth; these cases, therefore, do not properly belong to this group.

Uterine perforations have taken place in the most skilled hands and the occurrence cannot therefore be considered a wholly pre-

ventable accident. Its recognition, however, when it does occur, is most important, and its proper treatment is a matter requiring careful judgment.

To differentiate between false perforations and true perforations is very essential, but not always easy. I can only mention a few of the conditions under which false perforations may occur: a dilated Fallopian tube, permitting the curet to enter it, ectopic gestation in the uterine portion of the Fallopian tube with abortion into the uterine cavity; myomatous uteri, especially where degeneration and softening of the growth has taken place; double uterus; uterus unicornis; etc.

There have been cases where the abdomen has been opened and the uterus removed for this accident when no true perforation has been found. In the true perforation the peritoneal cavity is most frequently entered; however, the bladder, the rectum, the space of Retzius, the vesicouterine space, the culdesac of Douglas and the space between the folds of the broad ligaments; have all been entered by the curet, sound or dilator.

These perforations may be attended by considerable morbidity; the mortality however is likely to be low. It is when the abdominal cavity is entered and its contents injured that the most serious results follow and the mortality becomes high.

It is interesting to note that probably 25 per cent. of the perforations are caused by the dilating instruments. In the minds of most of us the curet and sound have had to bear the entire blame. With such a large proportion of these lamentable accidents caused by dilators, we must also use these instruments with the utmost care.

When perforation occurs high surgical skill is required to determine the safest course for the patient. In the series of cases referred to above the mortality was well above 25 per cent. This high death rate proves that we are dealing with a serious condition. A much larger number of these cases will recover under judicious surgical intervention than under a purely expectant treatment.

Under no circumstances should irrigation of the uterus be done where perforation is suspected. Several deaths have been shown to be due to antiseptic solutions being forced into the abdominal cavity or infection spread thereby.

When perforation has occurred and the uterus still contains secundines, curettage should only be completed after the abdomen has been opened and the uterus seen from above. If the finger can be used as a curet it should have preference over all other tools. Whether the abdomen shall be opened or not will depend largely upon whether the gut or omentum has been injured, whether a considerable hemorrhage has taken place or active bleeding is going on; whether the contents of the uterus are septic or the instrument entering the abdominal cavity has been a carrier of infection; whether the size of the perforation is large or the number of perforations many.

If infection has begun, total extirpation of the uterus is indicated. Expectant treatment should only be given when the perforation is

small; when there is no suspicion of infection; when there is no intraabdominal injury, and when the contents of the uterus have been completely removed.

The following cases were treated at the Coney Island Hospital. The first is given in some detail as it was unusually interesting.

CASE I.—Mary T. aged twenty-four, Italian, married, the mother of three living and healthy children. She became pregnant again and soon afterward her husband contracted typhoid fever, dying in the hospital later. Shortly after his death she miscarried when she was four months pregnant. There appeared to be a retention of the placenta and her physician attempted to remove it under ether anesthesia. He told me later that he did not succeed in removing it and was greatly shocked when he saw a loop of intestine presenting in the vagina. The patient was then sent to the C. I. Hospital where she arrived at 10:30 P. M. on April 11, 1916. Her condition was one of shock, pulse 150 of poor quality small and thready, her weight was 180 pounds and her abdominal wall very fat. She was prepared for operation as quickly as possible and the abdomen was opened at 11:30 P. M., through the usual median incision. Much blood and many blood clots were found in the abdomen. Diligent search failed to reveal the placenta and we concluded that it must have passed previous to curetment. The uterus was torn posteriorly from one uterine artery to the other just above the internal os, and through this opening a loop of ileum had been pulled. This was carefully withdrawn and examined; the gut was detached from its mesentery for 24 inches, torn in several places to or entirely through the mucous membrane; the mesentery of the sigmoid was also punctured in several places. Twenty-six inches of the small gut were resected and an end-to-end anastomosis made; the injuries to the mesentery of the sigmoid were repaired. A hysterectomy at the internal os was performed leaving both ovaries which were healthy. The abdomen was closed and the patient was given 2 quarts of saline by rectum before being removed from the operating-table. Her pulse at this time (12:50 A. M.) was 160, one hour and twenty minutes having been taken for the operation.

Her convalescence was stormy, on the fifth day following operation a fecal fistula developed, this closed spontaneously at the end of six weeks. The temperature ranged from 100° F. to 104° F. for a period of four weeks when it became normal. The patient left the hospital on June 8 in excellent condition.

This patient was seen on December 12, 1916. Her condition was splendid, weight normal, bowels regular, digestion good. Able to perform her usual work without discomfort of any kind. Menstruates for one day each month.

CASE II.—L. O. B., aged nineteen, U. S., servant, single. Admitted to the C. I. Hospital May 23, 1912 in a septic condition. A diagnosis of punctured uterus with intraperitoneal hemorrhage and peritonitis was made. Immediate operation was performed. The abdomen was opened and found to contain a large quantity of blood. There was a perforation in the fundus of the uterus about



1 inch long. A medium-sized soft rubber catheter was found among the intestines, the intestines and peritoneum were covered with a thick exudate. Complete hysterectomy was performed and a Mickulicz drain was placed. The patient died the following day.

CASE III.—Mrs. N., aged thirty-four, Norwegian, married. Admitted to C. I. Hospital, September 15, 1914. She was accompanied to the hospital by her family physician who stated that he had been called to attend this patient for severe bleeding from the uterus. He found she had had a miscarriage and from the history given she had not passed the placenta. She was about three months pregnant. On attempting to remove the placenta with the curet he felt the instrument suddenly pass through the uterine wall before the placenta had been removed. When the patient arrived at the hospital she was in shock, pulse 154, small and thready. She was subjected to immediate abdominal section. Considerable blood was found in the abdominal cavity, a perforation about  $1\frac{1}{4}$  inches long was found in the fundus of the uterus. This was closed by interrupted catgut sutures, the blood was sponged from the abdominal cavity. Before the abdominal cavity was closed the placenta was removed from the uterus per vagina by the curet. The abdomen was then closed and 2 quarts of saline were given by rectum before the patient was removed from the operating-table. She made an uneventful recovery and left the hospital in three weeks.

CASE IV.—A. M., aged thirty-seven, Scotch, married, mother of two children; suffered from retrodisplacement. During her third pregnancy she miscarried between the second and third month. This was followed by protracted bleeding. I was consulted and advised curetment, this was accepted. Under ether anesthesia it was found impossible to get the uterus into the correct position. The curet was then used but in spite of the usual care, the posterior wall of the uterus was perforated. This was shown by the presence of fat material curetted from the rectal wall. In this case a drain was placed through the cervical canal for forty-eight hours. The patient had an uneventful convalescence.

CASE V.—In this case in which I assisted, a large soft retrodisplaced uterus was curetted, preliminary to abdominal section for a suspension of the uterus by the Gilliam method. The operator punctured the fundus anteriorly, with the curet. When the abdomen was opened the perforation was found to be about 1 inch long. This was closed by interrupted catgut sutures. The uterus was then suspended and abdomen closed. The patient made an uneventful recovery.

#### DISCUSSION.

DR. POOL.—The surprising thing at an operation when perforation occurs is the ease with which it occurs. There is probably not a man in this room who has not had this experience, unless he is like the men who claim they have never lost a case of appendicitis. The inference is that he has not operated. A woman came into the service recently with a history of incomplete abortion last September.

She went along for two months without bleeding; I think she had one menstrual period. From that time there was bleeding, so much so that there was thought to be a possible epithelioma. She was curetted by an assistant and the curet went through the wall of the uterus. He made an incision in the culdesac to drain out the blood and the patient is now doing very nicely and is going to get well. I have perforated the uterus after abortion with a large size Palmer curet, going through the wall without knowing it. The blame rests on the doctor not for doing it but for not recognizing it when it is done.

DR. McNAMARA.—Perforation of the uterine wall during curettage after abortion is a surgical accident that may take place in the best of hands. In a case like that cited by Dr. Mayne and Dr. Robertson it can take place without undue force where the degeneration of the uterine wall has taken place. I have exhibited at least one specimen here where this accident had occurred and the uterine wall not showing to the naked eye where it was degenerated. It is not always the result of bungling work.

DR. WALTER B. CHASE.—I think it is a nice question in doing a curetment to know just how far you have gone. I remember one case when I was curetting for an accidental abortion, I became conscious of the fact that I had gone far enough to enter the abdominal cavity; I knew this by measurement. There was no sensation conveyed to my hand that I had perforated the uterine wall. There was no evidence of shock, nor was there any of local trouble or infection. I am convinced that the uterine muscle is so elastic and resilient that you can push a curet quite a distance against it without perforation, unless it is markedly diseased or greatly attenuated.

DR. WM. PFEIFFER.—This accident has twice happened to me. The first time was at the patient's home with the Goodell dilator, and was not discovered until the curet was inserted and found to pass beyond the fundus; there was no reaction, no douche used, no further interference found necessary, and the patient made an uneventful recovery. The second time was during a curetment under strict asepsis, and here also there was no reaction, the hands off policy being followed with the same good result. Another case occurred in Dr. Judd's service at King's County Hospital in a patient the victim of a criminal abortion; in this instance there was a loop of gut protruding from the vulva, and an intestinal anastomosis was done after resecting about 8 inches of the sigmoid. Hysterectomy was not done, but the culdesac was drained, and this patient also made a good recovery.

DR. HYDE.—It is interesting in some of the cases to note the change in the patient's condition when this accident occurs. I have been present in three cases. The pulse jumps so that the anesthetist notices it. Dr. Chase's remarks remind me of a case that occurred in the service of the late Dr. Hinds at the German Hospital. In measuring the depth of the uterus with a Simpson sound the instrument disappeared and we thought the uterus had been punctured. An abdominal section was done and the uterus was found to be normal. The sound had gone into the left tube.

DR. MAYNE.—It has been stated by some that the Fallopian tube cannot be entered by the curet, but the recital of the case by Dr. Hyde proves that it can be. I recall one other case in which a perforation occurred. In cureting a woman about the period of the menopause we removed some material that made me suspicious of carcinoma of the fundus. During the curettage the curet seemed to pass through the uterine wall. Realizing that we had probably a carcinoma we took her to the sanitarium and did a hysterectomy, and careful examination failed to find a perforation. The curet had gone to the peritoneal covering only.

DR. HENRY M. MILLS read a paper on

#### ACCIDENTAL INJURY TO THE URETER IN GYNECOLOGIC SURGERY.

After referring briefly to the salient features of the condition and the more recent literature, Dr. Mills reported three cases of injured ureter which he had observed.

CASE I, which I saw first had a leakage of urine through the vagina. The case was one in which a panhysterectomy had been performed for a fibroid uterus reaching nearly to the umbilicus. The cystoscopic findings by Dr. Read were as follows: The left ureter was free and the urine flowed freely. Right ureter obliterated about 4 inches from bladder opening and catheter could not pass the obstruction. Methylene blue appeared in the left ureter in nine minutes, and did not appear in the right at all. About the right ureteral orifice was a spot covered with mucus plaques. Methylene blue in bladder appeared in vagina in one minute. From these findings we judge that the right ureter had been ligated about 4 inches from the bladder and the leakage was due to a vesicovaginal fistula near the orifice of the right ureter. The patient, after observation for one week, left the hospital. I have learned from her physician that the fistula closed spontaneously three or four months later.

CASE II.—M. A., aged forty-three. Mother of two children. Menstruation regular up to one year ago when she began to flow every two or three weeks, duration six days, three or four heavy towels saturated daily. Vaginal examination: Uterus greatly enlarged, studded with fibroids; movable; adnexa not palpable; no tenderness in either fornix. Blood count: Red cells, 2,740,000; white cells 9600; hemoglobin 90 per cent. The operation consisted in a supravaginal hysterectomy and double salpingo-oophorectomy; cervical canal disinfected with phenol and alcohol; the round and broad ligaments were sutured to stump of cervix. Eleven days after operation the patient was moved from one bed to another. At this time she discovered for the first, the bed wet from urine. Upon examination urine was found leaking from the cervical canal. Three days later the cystoscopic findings by Dr. Fraser were as follows: The ureteral catheter passed up toward the right kidney is blocked at a distance of  $1\frac{1}{2}$  inches above the bladder; no urine obtained from the catheter on this side. Catheter passed up 8 inches in left ureter and urine flowed through in normal manner.

The vagina contained urine, was swabbed out and packed with plain gauze. Indigo-carmin then injected and at end of twenty minutes the dye showed from left ureteral catheter. At the end of twenty-five minutes the vaginal tampon was removed and showed blue stain. Diagnosis: obstruction of right ureter with leakage of urine through cervical canal. Three days later, the patient being in excellent physical condition an attempt was made to do an implantation of the ureter into the bladder. The patient was very fat and the pelvis deep. The broad and round ligaments having been sutured to the stump of the cervix changed the topography of the pelvis considerably. Indigo-carmin had been injected hypodermatically as an aid. A diligent search was made to locate the ureter at the crossing of the iliacs and also at the vesical end but it could not be demonstrated. A transperitoneal nephrectomy, as advised by Graves, in his Gynecology, was considered before closing the abdomen, but it would have taken a very courageous surgeon, indeed, to attempt it in this particular case. The case was transferred to the genitourinary service and three days later Dr. Cochran did a nephrectomy through a lumbar incision. The kidney was found to be perfectly normal with no dilatation of the pelvis, in spite of the occlusion of the ureter for at least ten days. When the kidney was removed the stump of the ligated ureter was picked up at the bottom of the wound and it was so friable that very gentle traction of the forceps pulled it asunder. It was remarked that possibly the patient was syphilitic. The Wasserman reaction, however, was negative. If the distal end of the ureter was in the same condition I am certain no one could implant such a ureter into the bladder. The patient has made a perfect recovery. The urine report from time to time shows normal urine. Systolic blood pressure one day after nephrectomy was 115.

CASE III is very similar to Case II, in which a supravaginal hysterectomy had been performed previously. A small fistulous opening in the left vaginal fornix leaked urine. The cystoscopic findings by Dr. Fraser were as follows: The right ureter admitted a catheter 11 to 12 inches. The left ureter admitted a catheter  $1\frac{1}{2}$  inches. Hypodermatic injection of indigo-carmin shows a stain from the right ureter but none from the left ureter. Gauze in the vagina shows a stain at the end of thirty minutes. Diagnosis obstruction of the left ureter about  $1\frac{1}{2}$  inches from the bladder. It is now six months since the hysterectomy was performed and the fistula still persists. It is planned to attempt an implantation of the ureter into the bladder in the near future.

In the three cases above the first was a ligation of the right ureter, with a vesicovaginal fistula which closed spontaneously. The other two were unilateral ligations of the ureter with vaginal fistulae. One of these was treated by nephrectomy and the last one requires operation as the fistula still persists not closing after a lapse of six months.

These cases are too few to draw any conclusions, but from reading it appears the proper procedure in a unilateral injury of the ureter would be.

When discovered at operation: 1. Implantation. 2. Anastomosis. 3. Ligation and dropping. 4. Nephrectomy.

When discovered subsequent to operation: Where there is fistula; incomplete: waiting four months; complete: operate as soon as able: 1. Implantation. 2. Anastomosis. 3. Ligation and dropping. 4. Nephrectomy. Where there is ligation and no fistula develops: doing nothing or nephrectomy for cause.

#### DISCUSSION.

DR. McNAMARA.—It is impossible to add anything to what Dr. Mills has so completely covered on this subject, practical as well as in the literature. I was present when he tried to find the severed ends of the ureter and the difficulties were so great as to make it almost impossible. The difficulty of locating the ureter in normal condition is great but in the presence of pathological tissue it is still greater. The conclusions mentioned by the writer of the paper are the only ones that can safely guide us. As soon as the occlusion occurs it is safer to take out the kidney. I hope someone will say a word about prophylaxis, the means of avoiding these accidents. We are all aware of the dangers of a fibroid hanging over and obstructing the ureter, such an accident being almost unavoidable.

DR. ROBERTSON.—Regarding prophylaxis. I assisted Dr. Judd recently in a hysterectomy for fibroid in which ureteral catheters were passed on both sides and these made excellent guides in determining the anatomical relations. They helped materially.

DR. POOL.—Cases in which the accident occurs are usually difficult to operate upon. In the course of an operation for the removal of a large fibroid we have already subjected the patient to a severe strain and I am rather in favor of ligation as the easiest way out of a difficult problem, and such a course would be justified. So far as a secondary operation is concerned I would never undertake to dig up a ureter than has been implanted.

DR. ZIMMERMANN.—I believe this accident occurs more frequently than we are aware of. Many a case of death from peritonitis or so reported is due to the injury to the ureter, and many cases will clear up themselves. One case in which it did happen to me was where I had removed an enormous fibroid and twenty-four hours later the patient began to leak urine. The case cleared up absolutely. I concluded that I had injured but not occluded the ureter. In many cases there is a temporary hydronephrosis and the atrophy. This accident is more probable in removing pus tubes and intraligamentous cysts, as in those cases there is a displacement of the ureter and the anatomical relations are dislocated. I believe if I had a case to-morrow I would tie it off and if anything occurred I would do a nephrectomy later.

## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

### *Section on Obstetrics and Gynecology.*

*Stated Meeting, Held December 27, 1916.*

DR. GEORGE W. KOSMAK, *in the Chair.*

DR. J. MORRIS SLEMMONS, New Haven, Conn., reported a case of

TWIN PLACENTA: NORMAL FETUS AND TERATOMA.\*

DR. HERMANN J. BOLDT presented the following case reports:

(1) PRIMARY ADENOCARCINOMA OF THE OVARY WITH METASTASES  
IN THE OPPOSITE TUBE AND OVARY.

The patient was forty-seven years of age, married twenty-nine years, and was never pregnant. Her present illness has lasted eight months. She menstruates at intervals of from two to three weeks, the flow lasting from eight to ten days, and is very profuse. She complains of pain over the entire lower abdomen and looks emaciated. From the examination the diagnosis of possible adenomyoma, solid ovarian tumor of small size, closely attached to the uterus, and chronic pelveoperitonitis was made. A panhysterosalpingo-ovariotomy was done on October 11, 1916. The technic was difficult because of intimate adhesions. The recovery was protracted because of the weak condition of the patient and an intestinal catarrh.

The pathologist reports a rather large uterus with both tubes and ovaries attached. The uterine walls are smooth and on the surface there are several nodular projections. On section there were revealed numerous small fibroids. One tube is closed at the fimbriated extremity and the outer portion is dilated. The ovary, probably the left, is slightly enlarged by the presence of a cyst measuring 2.5 cm. in diameter. On section this tube contains dark brown material resembling decomposed blood. The opposite ovary consists of a large rounded mass which is soft and cystic in some portions and moderately firm in others. Coursing over its anterior surface is the tube which is intimately adherent to it. On section, the interior of the ovarian tumor consists of soft yellowish-pink tissue resembling that of brain. Here and there is an occasional small cyst. Circumscribing the soft interior portion is a thin fibrous capsule which is apparently intact, but in places is very thin. It is intimately adherent to the side of the uterus, but there is apparently a fibrous capsule separating the two. The important

\* For original article see page 749.

pathological condition is found in the enlarged ovary. The central portion of this tumorous mass is composed of epithelial cells having a very irregular papillary arrangement. The cells are rather large but quite irregular in size and shape as indicated by the frequency of dividing forms and are multiplying quite rapidly due no doubt to the rapid multiplication and the imperfect blood supply. There are scattered throughout numerous small areas of necrosis. The amount of stroma is relatively small and has a branching formation upon which the epithelial cells are distributed. The capsule is very thin, particularly in places, and is evidently encroached upon by the internal proliferating growth, which is assuming infiltrative characteristics. The growth is without doubt potentially malignant but the presence of a metastatic nodule of a similar nature, and attached to the opposite tube and ovary, would distinctly indicate an active malignancy.

(2) ADENOCARCINOMA OF THE UTERUS WITH EXTENSIVE INFILTRATION OF ITS WALLS.

The patient was forty-two years old and a nullipara. For one year she has had irregular sanguinous discharges, watery at times and, at other times, very profuse menstruation. On examination of the interior of the uterus with a sound, it feels somewhat irregular and bleeds. He advised a curettage for diagnosis.

The pathologist reports a large uterus and cervix, with both ovaries and tubes attached. The cervix presents nothing worthy of note. Externally the uterine walls are smooth and moderately firm in consistency. On section the major portion of the uterine mucosa is irregular and roughened and has papillary projections here and there. In the fundus is a bulging protuberance, some 3 cm. in diameter. The mucosa at its lower border is poorly differentiated and appears over the bulged area to extend downward for 1 cm. or more. The muscular walls are considerably thickened and rather fibrous in nature. The microscopical examination shows that commencing in the cervical canal, the mucosa becomes very irregular and the glands assume characteristics which are distinctly atypical and abnormal in nature. The hyperplasia is most marked, however, near the fundus where the gland cells are found in irregular cylindrical columns which extend deeply into the muscular walls. The infiltration of the muscular walls has been most extensive and nests of neoplastic cells are found scattered from the fundus to the cervix. In the central portion between the cervix and the fundus, the uterine mucosa is desquamated and there is present instead an inflamed and granulating surface. The necrosis, however, is only superficial and collections of the tumor cells may be found immediately beneath the granulating surface extending practically through the muscle walls. Recovery after radical operation, uneventful.

(3) EPITHELIOMA OF THE CERVIX.

This patient was sixty years old, had had ten children, the last sixteen years ago. During the past four years she has had atypical

bleeding and seven months ago an amputation of the vaginal part of the cervix was made by another surgeon. The bleeding did not cease. Local treatment had been used in the interval. A diagnosis was made of cancer of the cervix and operation was performed on October 2, 1916. The technic was difficult because of the adhesions, and particularly the freeing of the ureters and the bladder. The latter was injured as was shown during convalescence. The rectum was also injured since a few days after the operation feces were passed per vaginam; but this injury healed spontaneously. The bladder injury is to be repaired in the near future. This is another instance of probably long duration of the cancer before radical operation. Comments on the treatment before the radical operation was done are needless. This seemed to be a very unfavorable case, yet the woman did well considering the complications.

#### (4) ADENOCARCINOMA OF THE CERVIX AND INTESTINE.

This patient was seventy-two years old and had one child thirty-three years ago. Her menopause occurred at the age of fifty. During the past two or three years she has had atypical bleeding. The clinical picture of cancer of the interior of the supravaginal portion of the cervix was clear; nevertheless, a small piece of the protruding tissue was excised and the report of the pathologist verified the clinical diagnosis. To the left of the uterus was a mass lying very close to this organ; it was supposed to be an ovarian tumor and seemed solid. At the subsequent operation this was proved to be the upper part of the sigmoid which had sagged into the pelvis. The uterus and intestine were excised. The patient succumbed to pneumonia. The interesting feature is, What was the primary seat of the cancer? Judging from the long bleeding and freedom from the symptoms of intestinal growth, we may assume that the uterine cancer was primary. It is also interesting to note the long duration of the cancer before the patient thought it desirable to seek advice.

#### (5) MYOMATOUS UTERUS; OVARIAN CYST; HYDROSALPINX.

This patient was forty-five years old and had one child fourteen years ago. She menstruated at regular intervals; the flow, however, was very profuse and lasted ten or eleven days. During the past three months she has had a rapid increase in the size of her abdomen and pain in the left iliac fossa. The feature of interest in this case is that because of the alleged rapid increase in the size of her abdomen, the diagnosis of myoma having been made, it was assumed that probably a malignant change in the growth had begun, in addition to a probably malignant tumor of the ovary.

The pathologist reports that the specimen consists of a uterus which is a firm mass more or less spherical in shape and measuring  $10 \times 8$  cm. Attached to its surface about 2 cm. from the tube are two pedunculated tumors, one measuring  $6 \times 4$  cm., the other  $6 \times 2$  cm. The tube measures about 3 cm. in length and appears to be



essentially normal. The ovary is converted into a cystic mass, the contents of which are not present. Distended this would make a globular tumor about 12 cm. in diameter. The cervix is well preserved. The fundus is converted into a rim of tissue enclosing a fibroid (?) tumor some 12 cm. in diameter. The uterine canal is readily visible though somewhat distorted and the fornix is occupied by another small submucous tumor. The two pedunculated tumors on section are composed of whorls of tough fibrous tissue. The ovarian cyst seems to be a unilocular cyst and section into the part remaining reveals nothing of special interest. There is, as well, a separate piece of tissue about 10 X 5 cm. which is evidently composed of an ovary and an encysted tube. Section through the ovary shows a corpus hemorrhagicum.

The microscopical examination shows a section of myometrium and endometrium through the fundus that the mucous membrane is limited to a narrow band enclosing a few glands and presenting an interglandular tissue suffused with blood. The myometrium shows some increase in the interstitial fibrous tissue, especially peripherally. There is throughout quite a decided round cell infiltration. A section from the midportion of the uterine wall, including endometrium, myometrium and tumor, shows the latter to have the typical structure of a fibromyoma. The endometrium is here thicker than at the fundus and appears essentially normal. The uterine wall is somewhat fibrous but shows less infiltration than does the section.

(6) DEGENERATED MYOFIBROMA; HEMATOSALPINX; CYSTIC OVARY.

This patient is thirty-one years of age and married fourteen years, and has never been pregnant. She has had irregular bleeding, profuse in quantity. She has also profuse leucorrhea, intense dysmenorrhea and severe backache. This patient was first seen in March, 1915, when operation was declined. She became gradually more ill and an operation was consented to on June 30, 1916. The recovery was uninterrupted and the patient is now entirely well.

The pathologist reports that when the uterine mass was split open it displayed a thin-walled organ enclosing a large nodular glistening tumor. On section this tumor appears as a multilobular fibroma, spherical in shape and about 8 cm. in diameter. The external surface of the uterus shows one small fibromyoma; section of the walls shows other small ones. One ovary is cystic and most of its bulk is made up of cyst with fluid contents (by palpation, not opened). The tube is somewhat distorted and the lumen is filled with clotted blood. The ovarian ligament is thickened and contains a large thrombosed blood-vessel. The other ovary consists of two spherical masses bound together by fibrous tissue. Of the described masses the larger consists of a thin walled cyst filled with a solid gelatinous material; the smaller on section shows two cavities filled with clotted blood. The tissue present has the appearance of ovarian tissue. The microscopic examination of the uterine wall shows the mucosa to be hyperplastic, the glands tortuous and dilated. Interglandular tissue is increased in amount and infiltrated with

round cells. The uterine muscle shows some interstitial round cell infiltration and small areas of hyaline degeneration. The section of the tumor shows much the same picture, a very cellular tissue, chiefly myomatous, with more or less hyaline connective stroma and larger and smaller areas of diffuse degeneration.

(7) SIMULTANEOUS EXTRA- AND INTRAUTERINE PREGNANCY, ABOUT THE THIRD MONTH.

This patient was thirty-three years of age and had one child ten years ago. When admitted to the hospital October 31 she had a uterus extending midway between the symphysis and umbilicus which showed the usual signs of pregnancy. Behind the uterus was a large fluctuating tumor the character of which was not diagnosed. Bleeding from the uterus was present and a large fragment of placental tissue presented itself, the embryo having been previously expelled. On November 2, the incomplete abortion was completed with a dull curet. The fluctuating exudate in the cul-de-sac was incised and dark blood exuded. The thought now occurred that possibly a simultaneous extra- and intrauterine pregnancy was present. On opening the abdomen the embryo with its placenta was found attached to the right tube and broad ligament. The question arose as to the advisability of extirpating the infected uterus, but considering the desire the patient had for further offspring it was not done. The woman died of sepsis. Under similar circumstances I would not hesitate to extirpate the uterus when an infection of the organ was as obvious as in this instance.

(8) UTERINE AND BILATERAL TUBOOVARIAN SUPPURATIVE INFLAMMATION.

This patient was thirty-five years of age and had never been pregnant. She has had irregular bleeding for about one year and has suffered intense pain in both iliac fossæ, most severe on the right side. It will be seen that the specimen shows the right adnexa to be larger than the uterus, and considering the gross changes it is difficult to understand how it was possible for the woman to do any housework at all. It is now three months since the operation, and she has been perfectly well ever since, not even being troubled with the usual "flashes" due to the quickly brought about menopause. When there is such gross changes in the adnexa, as was present in this instance, we have seldom found patients to have marked reflex disturbances after a radical removal of the pelvic contents. No examination of these organs by the pathologist was made.

DR. HARRY ARANOW reported a case of

TRAUMATIC RUPTURE OF THE UTERUS AND BLADDER IN LABOR: RECOVERY.

The patient was twenty-seven years of age and married three years. Her family, previous and menstrual history were unimportant. Her last menstruation occurred in the first week in September,

1915. She had one miscarriage at three months two years ago and one full-term baby one year ago. The labor was extremely difficult and the child was delivered by craniotomy.

Her present history was entirely normal. Early last spring she went to a physician to engage him "for her confinement." After taking her name and address, the doctor told her to send for him when she was in labor. When the patient suggested that perhaps the doctor had better examine her, as she had had a very difficult time with her first baby, she was told that it was not necessary. He, the doctor, knew all about her. Accordingly, without a pelvic measurement, without an examination of either mother or baby, this poor patient went into labor on June 9, 1916. For three days she suffered and bore down trying to force what seemed to be an impossible passenger through an impossible passage. Three days later the doctor decided to put on forceps on an unengaged head. Then something happened and the patient was rushed to the Lebanon Hospital and admitted to Dr. Rongy's service. The patient did not know what happened as she was under an anesthetic. On admission the patient had symptoms of shock, was pale and semi-conscious. The skin was cold and clammy, the heart action was rapid and feeble. The abdomen was tonically contracted, pushed over to the left and reached up to the costal margin. The fetal parts could not be made out on account of the rigidity of the uterine wall. The fetal heart sounds could not be heard by the ambulance surgeon. On examination the vagina was found to have been very shallow. The fetal head at the brim was unengaged. There was a tear in the right side of the cervix extending beyond the reach of the finger. As I could not feel any intestines I believed that the rupture was incomplete and I, therefore, made a careful attempt to deliver with forceps. As this seemed impossible and, as I also had an injured bladder to contend with, I preferred to do a laparotomy rather than a craniotomy. On opening the peritoneal cavity there was a gush of blood. There was a tremendous hematoma of the right broad ligament which filled the right side of the abdomen and pushed the uterus to the left. The rupture extended from the cervix to the right cornu of the uterus and was complete in the upper 3 inches. Most of the rupture took place between the layers of the broad ligament. The bladder also was ruptured extraperitoneally near its junction with the cervix. I turned the uterus out of the abdomen, delivered the baby by a median uterine incision, and then performed a supravaginal hysterectomy. The hematoma of the broad ligament was partly reduced by pressure and the layers united by a mattress stitch. The broad ligament was then whipped over with plain catgut. The bladder was sewed over by a few Lembert sutures. A cigarette drain was inserted into the pelvis and the abdomen closed by the usual layer method. The total time of the operation was forty-five minutes. The patient received 700 c.c. of saline intravenously during the operation. After being returned to bed her condition was desperate but by the following morning she had recovered considerably from the shock. She made an absolutely normal recovery.

To the average physician the mention of rupture of the uterus in labor at once suggests a labor badly managed. This view is generally correct, although there are a great many exceptional cases in which this accident is quite unavoidable. The frequency of this accident, according to statistics, varies from one to every 234 cases to one in every 60,000 cases of labor. In the Sloane Maternity Hospital, in a series of 20,000 cases it occurred thirty times, or once in every 666 cases, with a total maternal mortality of 86 $\frac{3}{4}$  per cent. In a series of 60,000 cases at the New York Lying-In Hospital, it occurred seventy-five times, or once in every 800 cases.

#### DISCUSSION.

DR. FREDERICK HOLDEN said: "I would like to ask whether a self-retaining catheter was put in. I ask this question because it would be most remarkable to obtain such a result without the use of a catheter."

DR. M. "RABINOVITZ: Regarding the rupture of the uterus, I do not understand how we can account for over three quarts of blood in the abdominal cavity and how it was that there could be a rupture of the uterus high up without the head of the fetus going back. About a year ago I saw a case of rupture of the uterus in which the patient had been given pituitrin and we felt the head drop back. If the rupture was in the lower segment of the uterus and if there was also a rupture of the bladder due to the forceps, or if the tear was distinctly cervical, we could explain the fact that the head did not recede."

DR. ARANOW, in closing the discussion said: "I should have had a self-retaining catheter inserted but in the excitement attending the extremely desperate condition of the patient the order was left out. When to my surprise she voided spontaneously the following day. I decided to leave well enough alone. In answer to Dr. Rabinowitz: What I really meant was bloody fluid, probably blood mixed with liquor amnii and urine, although the real hemorrhage was so extensive that we thought the uterine artery had been torn. As I have reported most of the uterine tear was between the layers of the broad ligament and the bloody fluid must have worked its way into the peritoneal cavity through the upper part of the tear. When we peeled the peritoneum away from the anterior wall of the uterus and the hematoma we found that we had a tear of the bladder. We then did the operation as described."

DR. WM. H. MORRIS (New Haven, Conn.) read a paper entitled

#### THE OBSTETRICAL SIGNIFICANCE OF THE BLOOD-SUGAR, ESPECIALLY WITH REFERENCE TO THE PLACENTAL INTERCHANGE.

So many difficulties beset the study of nutrition of the fetus in the uterus that thus far we have learned only a few facts regarding the nature of this process. It has been assumed, and probably it is a fair assumption, that the fetus requires the same food stuffs as the adult. Probably too its waste products are the same. Again, while it is certain that the fetus derives its food from the mother

and returns its waste products to her circulation for elimination, the mechanism concerned in this interchange has never been determined other than the fact that it is carried on in the placenta where the maternal and fetal circulations are brought near together.

At present we may choose between two hypotheses to explain the placental interchange; each view numbers among its adherents men whose opinions are entitled to consideration. One hypothesis, the vitalistic, originally announced by William Harvey, holds that the placental partition, or, in other words, the epithelium covering the chorionic villi, takes an active part in the process. Enzymes are said to be involved and the placenta is designated as a digestive organ. The other hypothesis, the mechanistic, holds that the placental partition takes no active part in the process, but is a permeable membrane permitting the passage of substances in solution. Accordingly the food stuffs and waste products passing from mother to fetus, or in the opposite direction, obey the laws of diffusion. The concentration of a given substance in the two circulations determine its movement. This has been proven to be the case for certain gases as carbon dioxide and oxygen, which pass equally well from either circulation to the other; but in the case of the food stuffs and waste products it is a question whether the placental partition plays an active rôle. Of late Hofbauer in particular has insisted that in all essentials the physiology of the placenta is comparable with the physiology of the intestinal mucosa.

With the improved methods for determining various constituents of the blood, important evidence regarding the problems of the placental interchange, it seems, might be secured, if, just after birth, samples from mother and fetus were obtained simultaneously and submitted to systematic analysis. Accordingly, about a year ago at the suggestion of Dr. Slemons, this plan of investigation was adopted in his laboratory at the Yale Medical School. In one of these studies published recently it was shown that urea diffuses through the placenta, and also that the nonprotein nitrogen in the two circulations is the same. Other observations soon to be published by Dr. Arthur H. Morse indicate that equivalent amounts of amino acids are present in the blood of both mother and fetus, and consequently an enzyme action is not required to explain the passage of nitrogenous food to the fetus. The lipoids also are under investigation, but the work has not progressed far enough to indicate what the conclusions will be.

The study of the glucose in the blood has been notably simplified since we possess an excellent method for its estimation, namely, that of Lewis and Benedict. It is the results of the blood-sugar determinations in mother and fetus at the time of birth that I shall report to-night. However, before discussing what is found at the conclusion of labor it will be helpful to consider the findings in normal pregnancy and the puerperium.

#### *Conclusions.—*

1. Normal blood-sugar values (0.09–0.11 per cent.) prevail during pregnancy and the puerperium.

2. During the early part of labor the values are normal, but in the second stage the blood-sugar is increased. In twenty-eight cases, at the moment of birth, the average maternal blood-sugar was 0.132 per cent.

3. The rise in the blood-sugar is partly due to the mother's voluntary effort to expel the fetus, and it is accentuated by the use of an anesthetic.

4. At the moment of birth the fetal blood-sugar is lower than the maternal. In twenty-four normal cases, in most of which an anesthetic was used, the average fetal value was 0.115 per cent.

5. The concentration of glucose in the two circulations is such that the placental interchange may readily be explained by the process of diffusion; and the lower concentration in the fetal blood assures a flow of glucose from mother to fetus.

6. After obstetrical operations higher values are found for the blood-sugar in both mother and fetus, and are explained by the influence of the anesthetic.

7. Normal blood-sugar values prevail in preeclamptic toxemia though a rise just before a convulsion. Also after repeated convulsions, with or without pronounced renal involvement, the percentage of blood-sugar may be notably increased.

#### DISCUSSION.

DR. A. A. EPSTEIN said: "The paper of Dr. Morris contained a fund of very interesting observations concerning the blood-sugar in gravid and parturient women. There is one point however, which seems to be universally overlooked, and yet is of considerable importance in studying the blood-sugar content, particularly of that of pregnant women. Rowntree has pointed out that blood volume in the course of pregnancy becomes very much increased, reaching an increase of some 33 per cent. over the normal, which increase disappears after parturition. In considering the blood-sugar content, one must therefore take into account this increase in blood volume, because it affects the percentage concentration of the blood sugar. Numerous observations of this kind have been made by me, which disclosed the fact that occasionally a glycosuria may occur when the blood-sugar content is apparently not increased. The absence of a hyperglycemia in such cases is found to be due to the increased blood volume, which causes a dilution of the blood-sugar; so that in considering the hyperglycemia of pregnant women, one cannot rely wholly on the percentage alone.

"The question of the influence of anesthesia is an important one. The anesthetic is undoubtedly a factor in influencing the amount of sugar in the blood. The cause of the hyperglycemia is twofold: On the one hand, mobilization of sugar caused by the anesthetic, on the other, the concentration of the blood, particularly if ether is used. The absence of a glycosuria after an anesthetic is explained on the basis of an altered or lessened renal permeability.

"Concerning the relation of the hyperglycemia to hypertension, which Dr. Morris took up in his paper, there appears to be no

definite relationship. The results of an extensive examination made on diabetic, nephritic and other individuals, show that no definite relationship can be established between the hyperglycemia and the hypertension.

"I would like to ask Dr. Morris whether he has made any repeated examinations of the blood-sugar in infants after birth."

DR. VICTOR C. MYERS said: "I am sure all have been much interested in Dr. Morris' paper and I think Drs. Slemons and Morris are to be congratulated because of having been among the first to carry out investigations of this kind in the field of obstetrics. By way of an analogy, I might mention some studies carried out last year by Dr. Fine and myself, dealing with the comparative composition of the blood and spinal fluid. Estimations of urea, creatinine, creatine, uric acid and sugar were made, with the view of comparing the passage of these substances from the blood into the spinal fluid with their passage into the urine. It was found that the concentration of urea in the spinal fluid in fifteen cases, mostly suffering from nephritis, averages 88 per cent. of that in the blood, the creatinine 46 per cent., the creatine 22 per cent., the uric acid 5 per cent. and the sugar 57 per cent. We were inclined to the view that the physical properties of these substances had much to do with the differences.

"From studies which we have recently conducted, we are inclined to the view that changes in blood-sugar may be dependent upon changes in the diastatic activity of the blood. With our method, normal activities range from 15 to 25. In severe nephritis figures between 30 and 40 have been encountered, while in diabetes the figures have varied from 40 to 74. Changes in blood-sugar appear to be accompanied by change in the blood diastase. It has been stated that the blood diastases are not changed after anesthesia hyperglycemia, but we believe that this topic is worthy of reinvestigation.

DR. C. V. BAILEY said: "In the twenty-eight normal cases reported, the average blood-sugar value during the early stages of labor was 0.10 per cent. As the second stage of labor progressed the sugar of the blood increased, the greatest concentration being reached at the time of delivery. An average increase of 32 per cent. was observed. This increase has been accounted for in part by the mother's voluntary efforts to expel the fetus. The mental condition of the patient must be taken into consideration. While carrying out some rather extensive tests in alimentary hyperglycemia necessitating the withdrawal of about 15 specimens of blood in a period of six hours, the patients exhibited varying degrees of apprehension at the onset. Classifying these twenty patients, it was found that those showing marked apprehension had a blood-sugar increase of 19 per cent. above their normal value. Those moderately anxious showed an increase of but 9 per cent., while those showing no signs of apprehension had their normal blood-sugar values. Anxiety and pain are greatest toward the end of the second stage of labor so at that time we would expect a rapid rise in the maternal blood-sugar. If a normal person ingests pure glucose the increase in the blood-sugar is slow; the greatest concentration not being reached before three-

quarters of an hour has elapsed. If the placental interchange be no faster than absorption from the gastrointestinal tract, we would expect the fetal blood-sugar value at birth but slightly above the mother's normal value. In the cases reported this evening the average fetal blood-sugar value at birth was 0.115 per cent., an increase of 15 per cent. as compared with a 32 per cent. increase in the maternal blood. It is quite possible that throughout pregnancy and during the first stage of labor, the blood-sugar value of the fasting mother and that of the fetus are the same. The value of blood-sugar estimations in pregnancy seems to be in the detection of those patients prone to the development of an excessive hyperglycemia with an accompanying decreased permeability of the kidneys to sugar. Glucosuria, *per se*, is not a contraindication to pregnancy. The case reported before the Section on Medicine on October 17, 1916, is of interest in this connection. This patient, aged thirty-one, was in her fourth month of pregnancy. For the preceding seven years her urine had constantly contained from 1 to 6 per cent. sugar. At the time of examination her blood-sugar was 0.089 per cent., certainly the lowest normal limit, while a synchronous specimen of urine contained 3 per cent. glucose. In the past seven years the patient has given birth to two perfectly healthy children and at the present time is free from complaints although her daily urine contains about 6 per cent. glucose."

DR. GEORGE W. KOSMAK: "Do you think that in such a case it is possible that there may exist an idiosyncrasy for glucose?"

DR. BAILEY: "This was a case of markedly increased permeability of the kidneys to sugar. The excretion of the ordinary urinary constituents was slightly decreased, a case of so-called "renal diabetes." Constitutionally this patient was not a diabetic. The history of the patient indicates the possibility of her being glucosuric from birth."

DR. MORRIS, in closing the discussion: As to Dr. Epstein's criticism, I realize that the volume of blood may have an influence on the absolute amount of blood sugar found, but I do not consider that in the study of the placental interchange it plays an important part. As to the reference made to Dr. Graham's work, it should be remembered that it referred to alimentary glycosuria in normal individuals, while in our cases the observations were made on fasting individuals.

DR. J. R. LOSEE and DR. D. D. VAN SLYKE presented a paper on

#### THE TOXEMIAS OF PREGNANCIES

They stated that although no general agreement had been reached concerning the nature of the substances causing the toxemias of pregnancy, two explanations have claimed special consideration.

Ewing and Wolf, noting the anatomical changes in the liver in eclampsia, the facts that leucine and tyrocine had been reported in eclamptic urines, and that they themselves found a decrease in urea and an increase in the "undetermined nitrogen" fraction of the urine, suggested that the amino-acids were incompletely catabolized



in the degenerated liver, and were the causes of both the toxemia and the abnormal nitrogen distribution. Later Murlin and Bailey, also working in the Cornell laboratory, attacked the same problem with the aid of Soeressen's formol titration method, which is specific for amines and amino-acids. They decided that not only the amino-acid fraction, but also the other nitrogen fractions of the urine are likely to be within the limits of normal variation both before and immediately after the convulsions of eclampsia, and that consequently the nitrogen distribution in the urine offers no reliable means for either diagnosing the pre-eclamptic state or indicating the nature of the toxin.

The other explanation is that abnormal acids in the blood are responsible for the toxemia. It is known that even in normal pregnancy a slight degree of acidosis is indicated by the carbon dioxide content of the alveolar air, and it is not illogical to suggest that an intensification of the acidosis might be a factor in the cause of eclampsia. Zweifel not only designated acidosis as the cause of eclampsia, but identified the specific acid as sarcolactic. This he found to be three times as concentrated in blood from the umbilical cord as in the venous blood of the mother, and he interpreted the results as proof that the mother is intoxicated by lactic acid formed in the fetus. It seemed to the writers desirable to test the acidosis hypothesis quantitatively on a number of cases in order to ascertain whether a degree of acidosis unusual for pregnancy regularly accompanies eclampsia, and whether the intensity of the acidosis is sufficient to account for the symptoms and ultimate coma noted. It seemed also not without interest to test with the gasometric method the proportion of amino-acid nitrogen in the urine in eclampsia, since the results of previous investigations on amino-acids in the urines of pregnancy, which have been performed with the help of the formol titration method, have not been entirely in agreement. While Hasselbalch and Gammeltoft found the proportion of amino-acid nitrogen normal (2 to 3 per cent. of the total nitrogen) in normal pregnancy, Falk and Hesky, with the same method, report results running chiefly between 3 and 7 per cent., 73 per cent. of the cases showing figures above the ordinary limits observed in nonpregnant women. We have determined in the urine the "total amino-acid nitrogen," which includes the nitrogen of the free amino-acids and also that of the amino-acid conjugated in such forms as peptides and hippuric acid. In normal individuals this nitrogen runs from 1.5 to 3.5 per cent. of the total nitrogen. Consequently the excretion of any considerable amount of amino-acids either free or conjugated would cause a marked rise in this figure. We have also determined the proportion of the total nitrogen in the form of urea, ammonia, and albumin. As a further index of the amino-acid metabolism we have determined in a number of cases the amino-acid nitrogen of the blood since the blood can be expected, even before the urine, to show evidence of failure of the organism to metabolize amino-acids with normal efficiency. The total nonprotein nitrogen and urea nitrogen were also determined in most of the blood analyses.

As a measure of acidosis we have determined the volume percentage of carbon dioxide bound in the form of bicarbonate by the blood plasma. Since all the reserve alkali of the blood, *i.e.*, the alkali in excess of that combined with acids other than carbonic, takes the form of bicarbonate, this figure indicates the alkaline reserve of the blood plasma, and in fact as the body as a whole. The urea was determined in both blood and urine by Marshall's urease method in the form developed by Van Slyke and Cullen. The amino-acid nitrogen of the blood was determined after precipitation of the proteins by alcohol, as described by Van Slyke and Meyer. The total nonprotein nitrogen of the blood was determined by Folin micro-Kjeldahl determination of the aliquot portion of the alcoholic filtrate from the blood proteins. The carbon dioxide capacity of the plasma was determined by Van Slyke's method. The albumin of the urine was determined by a modification of Walker's method. The total amino-acid nitrogen of the urine was determined on 25 c.c. of the albumin-free filtrate by the gasometric method. The ammonia was determined by Folin's aeration method.

We conclude that the toxemias of pregnancy can be either attributed neither to failure in diamination of the amino-acids, nor to the moderate degree of acidosis observed. The nature of the toxin or toxins therefore remains unknown. The nature of the functional disturbances which cause the abnormal nitrogen metabolism observed also still awaits a satisfactory conclusive explanation. Nevertheless the constancy of the low urea ratios in the urine in eclampsia, and of the high ammonia in pernicious vomiting, lends decided support to the opinion of Ewing and Wolf, that the nitrogen distribution of the urine, considered "in connection with all the data in the case," should assist in diagnosing the toxemias of pregnancy and in differentiating them from conditions such as nephritis and transitory gastric disorders.

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## TRANSACTIONS OF THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.

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*Meeting of October 13, 1916.*

*The President, G. BROWN MILLER, M. D., in the Chair.*

THE PRESIDENT read the address of the evening

A REVIEW OF 300 OBSTETRICAL CASES IN PRIVATE PRACTICE.\*

*Meeting of November 10, 1916.*

DR. W. R. MOULDEN presented the report of a case of

EMPYEMA OF GALL-BLADDER COMPLICATING PREGNANCY.

Mrs. D., aged twenty-nine, married ten years, three children living, nine, seven and three years old; two miscarriages, one at the third

\* See original article page 798.

and the other at the fourth month, between the last child and the present pregnancy, which has progressed to the sixth month.

For about two weeks previous to date of first visit July 11, 1914, patient has been suffering from frequent attacks of lancinating pain in the epigastrium, and radiating to the back, under the shoulder blade. The pain has been growing progressively worse, until now it is described as a tearing, stretching pain, accompanied by nausea and vomiting; malaise, headache of an intense type, and fever, with chilly sensations during the day. Bowels have not moved for three days, and have been sluggish for a long time, one movement every other day being her normal habit.

Present condition: Temperature, 9 A.M. 103.6°F., pulse 126. Palpation reveals uterus well above umbilicus, rigid right rectus in the upper quad. Intense tenderness on light pressure over the entire upper right half of the abdomen. Facies anxious and distressed. Skin has dirty tint but is not a frank jaundice. After a hypo of morphia and atropia had been given the abdominal rigidity subsided somewhat, and on repeated palpation it was thought that a distinct tumor mass could be made out starting under the liver and running down to, but distinct from, the top of the uterus.

Dr. Russell kindly saw the patient with me and agreed that the case should be immediately removed to the Hospital for further examination. When the 5-mile trip to the hospital was finished the patient was in so much pain, and the abdominal rigidity was so great, that, at the suggestion of Dr. Stone, whom we asked to consult with us, light chloroform anesthesia was administered. Dr. Stone then outlined the uterus, but could not be certain about a mass in the upper right quadrant. I think he rather suspected that the so-called tumor mass was the fetal extremities, the child being in the L.O.A. position. The doctor thought that, in all probability, we had to do with either a diaphragmatic pleurisy or, possibly, a sub-diaphragmatic abscess. We then had a blood cell count made, revealing a leukocytosis of 34,000. Dr. Lowe then very kindly made the urobiligen test and found it strongly positive. With this evidence we felt fairly certain of our ground, but thought it of sufficient interest to warrant further study by another man, so we asked Dr. Miller to pass upon the case.

If I remember correctly Dr. Miller would not commit himself, definitely, to a diagnosis of the exact pathology present, but strongly agreed that there was present sufficient cause for exploration of the upper abdomen.

Upon opening the abdomen through the outer edge of the upper right rectus sheath, an enormously enlarged and thickened gall-bladder, densely adherent to the omentum and to the hepatic flexure of the colon, was revealed.

After careful packing off the area the gall-bladder was drained through a trocar and canula of about 200 c.c. of very foul pus. An incision was then made into the fundus and seventeen small stones were scooped out of the dilated cystic duct. Palpation along the hepatic and common ducts revealing no further stones, the

wound was then closed in layers, around a large rubber drainage tube sewed into the incision in the gall-bladder.

The patient made an uninterrupted convalescence, except that she tried very hard to miscarry about every other day for a period of about two weeks. These attempts upon the part of the uterus were invariably foiled, however, by morphine and atropine with the result that the patient returned home, and in due course of time was delivered, at term, of a boy baby weighing 8 pounds and 6 ounces. The drainage kept up for about two months following the operation; the opening then closed but opened again about a month after the baby was born. Then followed a number of months during which it would close, remain closed a number of weeks and then, after disagreeable symptoms, open again, drain copiously for awhile, and repeat the former performance. It was realized at the first operation that such a badly damaged gall-bladder would probably have to be removed at some subsequent date, and the patient and her husband had been so informed, so when, on July 22, 1915, urgent symptoms arose she readily consented to go to the hospital for cholecystectomy.

At this time she had slight jaundice, pain and nausea, suddenly relieved by a gush of bile from the old drainage wound.

We opened through the rectus sheath, dissecting out the old scar and the drainage tract down to the gall-bladder. Palpation of the latter revealed the presence of a number of stones there, and also in the cystic and common ducts, none could be felt in the hepatic ducts. The stones in the ducts were successfully milked back into the gall-bladder and the latter removed, unopened. The common duct was then explored and found to be obstructed, at its lower end, by a firmly impacted stone, apparently in the ampulla of Vater. As it proved impossible to dislodge this mass back into the common duct, the duodenum was then opened, and after great difficulty, the small mass was pushed up into the duodenal incision and the mucous membrane incised, revealing five small stones firmly adherent to the walls of the ampulla. The common duct was then proved clear by passing a small rubber tube through it into the bowel, after which the latter was closed in the usual manner. A small drainage tube was then sewed into the stump of the cystic duct; a cigarette drain introduced in front of the duct and the wound closed in layers around the drainage.

Despite the extreme length of the operation, about two hours, the patient left the table in good condition with a pulse of 76, respiration of 18.

Convalescence uneventful. Cigarette drain removed on third day. Cystic duct tube floated out at the end of the third week. Drainage opening closed in about ten days, and has remained so to the present time, something over a year after the last operation. Bile appeared promptly in the stools following the operation, there being very little drainage through the tube. Incidentally the patient is now in better health than for many years, having turned from a chronic grumbler, into a robustly healthy and cheerful woman.

DR. TRUMAN ABBÉ reported a case of

POSTPARTUM CONVULSIONS.

Mrs. O., a white woman twenty-five years of age consulted me in the seventh month of her first pregnancy to make arrangements about her future care. She gave a history of possible scarlet fever as a child, no signs of nephritis, no epileptiform attacks at any time, no hysterical symptoms. During the second month and third month of her pregnancy she had had severe hyperemesis so that the physician who was attending her had considered ending the pregnancy. But rest in bed and a very light diet had carried her past that early danger period, and for some three months before coming to me she had had no troubles other than those normally expected. At the time of my first examination she had normal heart, lungs, breasts, nipples, and ample pelvic measurements. Her pulse was about 76 and her systolic blood pressure 120 millimeters. Her urine was acid, specific gravity 1016, no sugar, no albumin, no casts. There was no vomiting, no salivation, no tenderness of the liver. She ran through the remaining two and a half months of her term without any variation of interest from the normal. Urine examinations made every two weeks and blood pressure taken as often showed no abnormal variation.

Labor was calculated due July 5th. and pains started on the 11th. Her blood pressure taken two days before was still 120 and her routine urine examination also normal. Labor went through uneventfully for a primipara. Sixteen hours after the first pains the child was delivered without instruments. The patient had one hypodermic of morphine grains one-fourth about the twelfth hour of labor and during the last fifteen minutes she was given a little ether with the pains. She was unconscious from the ether for possibly two or three minutes as the head came over the perineum. She was perfectly conscious, however, before the delivery of the placenta when a suture was placed to close a small nick in the perineum, which we state merely to emphasize the fact that the quantity of ether given was the minimum. There was a moderate loss of blood, possibly 6 or 8 ounces. We congratulated ourselves that our grave dangers were over, and had the patient moved to her room two hours later. She had been made comfortable in her own bed and left to sleep when within fifteen minutes she had a convulsion lasting some three minutes biting her tongue and followed by stupor from which she was just rousing when I saw her some ten minutes later. She came to enough to complain of an intense headache, and darkness in front of her eyes. While we were preparing some solution for rectal irrigation she had a second convulsion followed by stupor and a third convulsion within a half hour from the first. Her blood pressure at that time was 140 mm. Without further delay we took 18 ounces of blood from her arm and got prompt improvement in the mental condition. The headache disappeared, the sight became clear, and there was no more stupor on convulsions. The blood pressure dropped about 15 mm. with the vene-

section but did not go below 134. The next day it was nearly 140 again but there were no other evidences of the toxemia. The urine showed a slight quantity of albumin, but no casts were seen. The blood pressure remained between 135 and 140 until the fourth day when it dropped to 120 at the same time that the secretion of milk appeared in the breasts. We had continued the Murphy drip water for two days and gave large quantities of water by mouth with liquid and soft diet taking blood pressure three or four times a day, otherwise the recovery was uneventful. The infant gained a little slowly and is still underweight. He is very apt to vomit after nursings if the mother is in the least upset. Bottle feedings are usually well retained.

We report the case not only because postpartum convulsions are less common than the antepartum ones but also because before labor there were in this case none of the expected forewarnings of eclampsia except the hyperemesis of the early months that had completely cleared upon increase in blood pressure, and no albuminuria or deficiency in specific gravity of the urine, which led us to believe that the toxemia causing the hyperemesis was past. There was no chloroform given (ether being used) to add to the liver degeneration and only one dose of morphine to decrease elimination.

We interpreted the convulsions as due to the toxemia of pregnancy and labor. Whether they should be called eclamptic depends on the definition of the word eclampsia. If the word is used to include all the toxemias of pregnancy this is a case of postpartum eclampsia. If the word eclampsia is used to mean toxemia due to a special type of liver or kidney cell degeneration, perhaps the case is not one of that kind of eclampsia.

In connection with the proposed amputation of the breasts for eclampsia, and the injection of oxygen into the udders of cows in their toxemias of pregnancy, it is interesting in this case to note the drop of blood pressure to normal only when the milk secretion started. We know of no other observations on this point and appreciate that a single observation carries no proof with it, but at least it suggests the desirability of further observations. The fact that certain toxins are excreted in the milk is well known and appreciated by us all. The tired mother gives milk that often upsets her nursing infant as shown in the late afternoon colic of so many babies. The milk of the menstruating mother has also a well-earned reputation for causing colic in her nursing. The distinction between the secreting function of a gland and its excreting function does not seem to be a very hard and fast one. It is probably true that many of our glands carry on the dual function hand in hand. Our largest gland the liver as we all appreciate secretes products for reabsorption and excretes other products for elimination by the same common duct and so far as we can tell both at the same time. We do not always think of the dual function of the breasts which we appreciate during the nursing period, as also going on during pregnancy. In this case the suggestion arises that during the pregnancy and more markedly immediately following labor the toxins secreted in part at least by the breasts which have since upset the infant were dammed up in the

breasts and caused the poisoning of the mother and that when the breasts begin to rid themselves of their products the final symptoms of the toxemia, the increased blood pressure disappeared. We would suggest the further study of the question by routine taking of the blood pressure immediately after labor in every case. We believe that such an observation in this case would have warned us of the increasing toxemia and led us to administer water and alkalies by mouth in an attempt to avert the convulsions.

#### DISCUSSION.

DR. WILLSON commented on a case he had reported some years before of convulsions six hours postpartum, in which there had been antepartum symptoms. The patient had pulmonary edema with the convulsions, for which venesection had been successfully done. The relation of the breast secretion to the toxemia of pregnancy was worthy of consideration. The total secreting surface of the breast was so great that it must affect the general metabolism and undoubtedly was modified by the internal secretions at all periods of life. That the breasts were affected by the menses, by the pelvic organs, and perhaps by the blood seems rather more likely than by nerve reflexes. He noted the treatment of parturient paresis of cattle with oxygen and the suggestion of the subcutaneous injection of oxygen into the breasts of the eclamptic to get increased oxidation. The distention of the udder with oxygen, or other substance, produced good effects probably by the ischemia rather than by oxidation.

DR. HUME reported a case of postpartum eclampsia relieved by bleeding and morphia. He believed in venesection for eclampsia, and suggested applying the blood pressure apparatus adjusted at, perhaps, 190 millimeters and letting the patient bleed from the vein below the arm band until the flow stopped.

DR. HOWARD HUME read a short paper on

#### THE CYSTOSCOPE IN GYNECOLOGY.

The use of the cystoscope in gynecology has been very much neglected by most of us and we have called the genitourinary specialist in to unravel many very simple conditions. To be a true gynecologist one should know how to get and interpret cystoscopic findings and I feel that it is just as important to do this as it is to be able to use the vaginal or rectal speculum.

One of my professors at the University of Virginia used to say that in order to be a specialist one should examine the rectum. We now have to extend this to the bladder and stop many of the useless irrigations that are done for pus conditions of the kidney.

The following case seen out of town will illustrate the advantage of a cystoscopic examination:

April, 1914, Case 171, Mrs. P., para-ii was seen at her home in Virginia. She had had "kidney trouble" since her last child was born about eight years ago and had a stillbirth about two years ago. Due to this cause she had been running a temperature from 100 to 102 and

had albumin 2 per cent. for several weeks. In the last few days a large easily palpable mass had shown up in the left side of the abdomen with intestinal obstruction symptoms. It was deemed advisable by the surgeon to do a left rectus incision for exploration as soon as possible.

She was sent to the hospital and before the anesthetic was administered the bladder was cystoscoped and the left ureter seen discharging urine containing pus was catheterized. The catheter passed about one-half the way up the ureter and about 2 ounces of pus-laden urine was withdrawn. It was decided to change the incision to a left kidney incision and a large pyonephritic kidney was drained by the surgeon in charge. "Here is an example where the cystoscope made the diagnosis. Many of us have seen operations for acute appendicitis and even gall-bladder disease where the kidney was responsible for the trouble. It is rather embarrassing.

Stones in the bladders of women are rare as compared with men but in the kidney, pelvis and ureter are about as common. When in the ureter the use of the shadow-casting catheter is a wonderful help in differentiating a stone from a phlebolith.

Mrs. J., 1916. Referred by Dr. C. C. Marbury. Had a typical history of right ureteral stone. X-ray showed the stone at the third lumbar vertebra. With a shadow catheter the obstruction was demonstrated at the same point. At the time of operation a ureteral catheter was placed in the ureter as far as it would pass. This made a very simple and easy guide in locating the stone although the patient was very fat weighing almost 200 pounds.

Probably you are just as familiar as I am with the cystoscope as a diagnostic means and I shall not take any more of your time citing cases. What I especially wish to call your attention to is the use of the ureteral catheters in pelvic operations especially carcinoma of the cervix and multiple fibroids. W. J. Mayo (*J. A. M. A.*, vol. lxvii, No. 8, p. 1284) states:

"In pelvic operations I believe that a great many times without knowing it the ureter is tied and there is nothing to show for it but a quickening of the pulse for a few days. Ligation of a ureter in a diseased kidney might make trouble."

Of course none of us wish to ligate the ureter under any circumstances unless it is a necessary part of our operation. But to cut the ureter and not tie it is a different picture and one which is liable to worry both patient and surgeon no little bit besides subjecting the former to one or more operations.

Transplanting and anastomosing the ureter has not been as successful as would seem in a large majority of cases and has frequently been followed by a hydronephrosis.

The use of the ureteral catheter in pelvic operations is not new. John G. Clark in Kelly and Noble, 1907, page 735 says:

"In my first article on the radical (for carcinoma uterus) operation, the use of the ureteral catheter was strongly advocated, but in the last few years this rule has not been followed uniformly and they have been used only when the ureteral area was encroached upon. With the greater facility of catheterization incident to the improvement in



electric cystoscopes, ureteral catheters should more uniformly be employed for it is of the greatest possible assistance in the course of the radical operation to have these ducts constantly under touch. The ureters without this guide may easily be located in the majority of cases, but occasionally it will not be the child's play that some surgeons would have us believe."

The same author says (page 735):

"In my own experience I have never seen any traceable harm follow their employment, nevertheless it is not wise to leave them unnecessarily long in place."

Paul M. Pilcher (Practical Cystoscopy, page 26) says:

"We are able by the aid of cystoscopy to determine the presence or absence of a second kidney; to locate fistulous openings in the bladder or ureter; to determine the feasibility of surgical intervention; and to aid in pelvic operations by placing the catheter in the ureter as a guide."

In 1913 I had the misfortune to kink the right ureter at the pelvic brim while doing a hysterectomy for multiple fibroids and was forced about ten days later to remove the kidney on account of a hydro-nephrosis. This caused me to have more respect for the ureter and to use all the care I could in protecting it.

I began by placing the ureteral catheter in any fibroid case where the tumor was low down in the pelvis and there seemed a possibility of its being in the broad ligament. I soon learned that these cases are probably as hard to catheterize as any one will encounter.

On one occasion I had to give up getting either ureter and in two others was able to only find one. The first of the last two had the ureteral orifice in a straight line with the urethra and it was not until after the abdomen had been opened was I able for a certainty to say which ureter I had entered with my catheter although the catheter seemed to travel to the right at the time of introducing it. The second case (a negro, J. J., Oct. 17, 1916) done at Providence Hospital three weeks ago had multiple fibroids and I was only able to find the left ureter in her.

I have used the ureteral catheter in ten cases but all have been fibroids where the necessity for placing the catheters was not as great as in carcinoma cases (I am very rarely removing the cervix in these cases). The ease with which the catheter is located in the abdomen is certainly gratifying.

Mrs. K., Sept. 26, 1916, was referred to me by Dr. Sansbury, had a carcinoma of cervix and vaginal vault and a full-term pregnancy. I tried to get ureteral catheters in her but failed because she could tolerate only a small amount of water in the bladder and the catheter washers allowed water to leak over my eyepiece and prevented my locating the ureters. The ureteral openings were easily located before placing the catheters and guide. I operated and did a Cesarean section followed by a complete Wertheim hysterectomy and injured the right ureter so much that five days later she developed a small fistula with which she left the hospital. I feel certain that with catheters as guides no damage would have resulted.

I catheterized a patient for Dr. Shoupe in May but it was not

necessary for he only did a high amputation of the uterus and did not have to work near the vagina. The catheters were easily palpated. Last month I passed catheters for Dr. R. Y. Sullivan who did a complete hysterectomy of carcinoma. In his case the two catheters used were old and soft and he was unable to feel them in place, but he had the satisfaction of knowing that neither ureter was cut as the catheters were removed in good shape. There has always been a great deal of mystery surrounding cystoscopic work and there are many who claim that only the elected few should wield such a wonderful instrument. The fact is that with women the work is exceedingly simple and only once in a great while is it necessary for a general anesthetic to be given.

I use a Brasch examining and catheterizing cystoscope and find it as satisfactory as could be wished. It is a comparatively cheap instrument consisting of a straight barrel with a cold lamp in a beak at one end and the other fitted for irrigation and a glass window. An obturator is used to fill the barrel when passing. This is removed and either the full round window is used or the half round window, the lower half carrying the catheters. Glycerine is used as a lubricant and plain water to fill the bladder, which may be refilled or irrigated as often as necessary with very little trouble. The electric current is run through a small rheostat and may be alternating or direct. A small dry cell will answer.

#### DISCUSSION.

DR. MILLER thought every gynecologist should be able to do cystoscopy and ureteral catheterization. Pains in the pelvis were often due to trouble with the bladder.

The cystoscope could be used in the office. It rarely needed more than 10 per cent. solution of cocaine for anesthesia. The Kelly cystoscope was very useful in many cases, especially for removing foreign bodies. The catheterizing cystoscope, however, was the choice. There were cases in which the ureteral openings lay behind a fold at the base of the bladder. The desirability of catheterizing the ureters in the presence of bladder ulceration was doubtful. He had seen mucus on the end of the catheter as it was being inserted into the ureter. In carcinoma of the uterus he always catheterized the ureters before the Wertheim operation. He not infrequently found bloody urine in the ureters after the operation, probably due to the catheter remaining in the ureter so long. In a few cases he had a urinary fistula in spite of the catheter, probably from the necrosis of tissue. He never catheterized the ureters in fibroid operations, as they were not likely to be encroached upon. It took about ten minutes to catheterize both ureters and saved half an hour of the pelvic operation.

DR. SULLIVAN was grateful to Dr. Hume for catheterizing cases for him and felt that it saved much time. He had never catheterized the ureters himself during operation, but got someone to co-operate with him thus saving the operator's time. It took about forty minutes for catheterization.

He also found the cystoscope very useful in differentiating between diseases of the appendix, cystic ovary, spasm or kink of the ureters, and spasm of the colon. It was also useful in treatment of cases of pyelitis of pregnancy.

DR. MILLER said the Superintendent of Columbia Hospital for Women believed in instructing the interns in cystoscopy and ureteral catheterization. It was certainly useful in emptying pus in cases of pyelitis during pregnancy and might save emptying the uterus. He believed that every gynecologist should use both cystoscope and proctoscope. He reported one case of fibroids in which he had split the tumor in order to remove it, after the operation the patient secreted bloody water and no urine for several days. The autopsy showed no injury to the ureters. One kidney had been destroyed by pressure and the other so congested that its secretion was suppressed. The postoperative catheterization when the catheters stopped at the site of a ligature, suggested a method of relief. The limit of life of a kidney after tying the ureter was about forty-eight hours.

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*Meeting of December 8, 1916.*

*The President, G. BROWN MILLER, M. D., in the Chair.*

DR. J. F. MORAN reported

TWO CASES OF CESAREAN SECTION FOR FETAL DYSTOCIA.

I wish to report two cases of Cesarean section performed for fetal dystocia. The first was prompted because of shock developing during etherization to determine the cause of the protracted dilating stage and the second was done for a persistent and irreducible brow presentation.

CASE I.—Seen in consultation with Drs. Waters and Hart. Mrs. X., aged twenty-seven; primipara; at term. Labor began Jan. 17, 1915 in the early morning. When I examined the patient twenty-four hours later the cervix was found to be dilated about the size of a dollar and the waters had ruptured. Palpation showed the head was dipping into the inlet with the occiput in the left anterior position, and no apparent disproportion between the inlet and the presenting part. As the labor appeared to be progressing satisfactorily I advised against interference. Saw the case again at 7 P. M. and examination showed relatively the same condition as at the previous examination and inquiry elicited the fact that the pains recurred at long intervals and were not severe, the condition of the mother and child was satisfactory, noninterference was again advised and a sedative recommended to secure some sleep. Was again summoned after midnight and as no substantial progress had been made it was decided to make a thorough examination under ether. Hardly had the administration begun when the pulse rapidly rose to 160 and the respirations to 60. Restoratives were administered and it was several hours before the pulse and respirations returned to

normal. It was realized that attempt to deliver by the vaginal route would be extremely hazardous and Cesarean section was therefore advised and accepted. The patient was removed to Sibley Hospital and section was performed under gas oxygen administered by the late Dr. Hunt. Living child weighing  $8\frac{3}{4}$  pounds was extracted. Examination of the infant's head showed hyperossification, the anterior fontanelle was closed on one side leaving a triangular space with base in the median line instead of the usual kite-shaped space. The head diameters were oversize, the suboccipito bregmatic was  $4\frac{1}{8}$  inches, occipitomenal, 5 inches and the biparietal, 4 inches.

These findings readily explained why the head did not mold and descend and in the judgment of the writer forced delivery by the vaginal route would probably have resulted disastrously to the child and in traumatism of the mother.

CASE II.—Seen in consultation with Drs. Russell and Moulden at Georgetown University Hospital. Mrs. Y., aged thirty-four, suffered an attack of anterior poliomyelitis at the age of seven which affected the left side. External conjugate 19 cm., other measurements were normal. Multipara-ii. First labor was terminated by forceps, after twenty-four hours; the second was spontaneous but long and tedious on account of a rigid cervix.

When I was called in consultation June 23, 1916, 9 P. M. in her third confinement, labor had been in progress about ten hours and the waters had ruptured spontaneously several hours before. On palpation the brow was found to be presenting with the occiput directed to the left. Vaginal examination revealed slight asymmetry of the pubic arch on the left side, a very rigid cervix and external os dilated 2 inches. An attempt was made by combined manipulation under ether assisted by Dr. Russell to convert the brow presentation into a more favorable one but this maneuver failed because of the rigid cervix and the retraction of the uterus. A sedative was administered and the patient obtained several hours of refreshing sleep. Examination at this time showed no change and as it was apparent that the delivery per vaginam could not be effected without the risk of rupturing the uterus and probable loss of the child Cesarean section was proposed and agreed to. The classical section was performed. Living child weighing  $7\frac{3}{4}$  pounds was extracted. The cord was circled around the neck twice. Mother made an uneventful recovery and the child is doing nicely. The rigid cervix and the cord being around the neck was probably the cause of the brow presentation.

#### DISCUSSION.

Dr. STONE commented on the ever-widening indications for Cesarean section as most startling, and suggested that indeed we might get to the point where woman would never willingly go through any other form of labor. Personally in the cases reported he would probably have let the labor continue longer. He would like to know how one was to decide that the child could not be safely

delivered in such cases. Nature did wonders at times in adapting the child to the normal passages. Success in cases reported modified future tendencies.

DR. RIGGLES reported a case of face presentation which he changed to an L.O.A. held it there for five hours, but the child was not delivered. That case should have had Cesarean section.

DR. WALL said Dr. Moran had considered the viability of the child as one of the main indications in determining the line of treatment. He considered these decisions determined by an obstetrical genius.

DR. RUSSELL was most grateful to Dr. Moran for his help. He spoke of hemastasis in Cesarean cases as not being so well cared for as in general surgery. In the last case which he had seen, the operator had paid special attention to hemastasis, the patient's pulse had never gone over 80 either during or since the operation.

DR. WILLSON classified the fetal indications for Cesarean section as disproportion or danger to the child's life. He classed Dr. Moran's case in the first group; in the second group he would put such conditions as placenta prævia and prolapsed cord.

DR. MORAN, in closing, said that the first case well illustrated the border-line type in which unfortunately we have no absolute means of determining the density of the bones of the skull, whether they will mold sufficiently to permit of a natural birth. Furthermore, the result in a given case is often fortuitous and not dependent upon the method of intervention elected. He had in mind a similar case with marked frontal protuberances and hyperossification of the bones of the skull in which he did a high forceps operation and the child died on the third day as though from meningeal hemorrhage. In the second case the indication for Cesarean section was absolute because of the unsuccessful effort to reduce the brow presentation and the almost certain rupture of the uterus and loss of the child if delivery had been forced by the vaginal route. In this connection he had painful recollection of two similar cases in which he did forceps extraction getting a dead infant in each instant and the mothers had to be subjected to subsequent operation for injuries to the parturient tract. Experience is often a sad but very worthy teacher.

DR. SULLIVAN reported a case of

#### SUSPECTED MALIGNANCY OF THE CERVIX,

with presentation of the microscopic section.

DR. MILLER said the examination of the slide showed that the condition was one of undoubted malignancy. He would have called the condition an adenoma carcinoma, but he considered Dr. Cullen the greatest gynecological pathologist in the country, and his diagnosis of sarcoma was in all probability correct. He had had a case of bleeding from an ulcerated cervix, in which he had suspected malignancy and excised a bit of tissue for diagnosis. Dr. Cullen had said that the tissue was not malignant, though he could not make a definite diagnosis. Within a week the patient broke out with a secondary syphilide. The most malignant cancer cases were those

that had adenocarcinoma of the cervical canal. Sarcoma of the uterus as he had seen it was usually a broken-down mass. The prognosis was bad.

DR. ABBÉ said pathology was advancing like the clinical diagnosis to the consideration of precancerous lesions and both pathologist and clinician were studying the stage of transition where the diagnosis must always be doubtful, as the transition from normal to cancerous conditions was a very gradual one. The point that Dr. Sullivan had made as to the patient's gain in weight and improvement in general health was to him a very interesting one in that for a number of years he had been urging an interpretation of a gain in weight and the improvement of the general health as definite symptoms caused by an early cancer. The loss in weight and general health which was described in our text-books as a classical symptom of cancer appeared at such a late stage of the disease that it was of little value in making the diagnosis if the object of making the diagnosis was treatment with the idea of curing the disease.

Many of us were apt to be misled by this text-book teaching into thinking that when a patient was gaining in weight cancer was excluded. The experience of a number of years in taking histories of cancer cases and in watching the postoperative progress of a number of such cases had emphasized the conviction that a gain in weight was extremely suspicious as a definite symptom of cancer. He did not understand just how Dr. Sullivan wished to have the gain in weight of this patient interpreted, but to his mind this was only one more example of the same cancer symptom.

DR. STONE said the Germans were claiming 40 per cent. cures in their operative work on cancer of uterus. The explanation for the much larger percentage of cures than could be gotten in this country was due to getting earlier cases. Amputating a cervix and waiting for a report on the stained section always caused a delay of approximately a week to the disadvantage of the patient in cancer cases. He thought it ought to be possible to make a frozen section diagnosis and that such should be prepared for at all hospitals. As to the operation of choice, he felt sure that he had done radical operations where they could not be curative. Attempts to clear lymph nodes from the bifurcation of the aorta, for instance, served merely to open up new channels for the spread of the condition so that he had recently limited his operations more and more except in the early cases.

DR. MILLER spoke of the unsatisfactory character of examination of frozen sections and doubted the value of such work in the border-line cases. He urged more intimate coöperation between the pathologist and the surgeon, making the latter a better gross pathologist. In the border-line cases he thought it wiser to wait for a stained section rather than do a Wertheim operation on an inflammatory condition.

DR. SULLIVAN thought that he would have done better by performing hysterectomy at first. There was a possibility in his case of carcinoma of the cervix and sarcoma of the body coexisting.

## TRANSACTIONS OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY.

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*Meeting of January 10, 1916.*

*The President, JOHN D. McLEAN, M. D., in the Chair.*

### THE RIGHTS OF THE UNBORN CHILD.

REV. A. J. SCHULTE considered

#### THE RIGHTS OF THE UNBORN CHILD AS VIEWED BY THE CATHOLIC CHURCH.

In order that an action may be truly righteous, it must be good from its inception to its consummation. No end, however, legitimate, can justify a resort to means that are in themselves wrong. Thus it is wrong to take the life of an innocent being. If an action good in its object happens to have two effects, the one good and intended, the other bad but not intended, this act is justifiable, provided that it is necessary, that the good overbalances, or compensates the evil, and that the evil be not a means to the end, but an unavoidable adjunct. A being consisting of a body and soul substantially united is a human being, however undeveloped that man may be. At every stage of its life natural and inborn rights cling to it. From the moment of its conception the fetus has a natural right to develop in its natural habitat until the time arrives to see the light of the world. Abortion may be direct or indirect. Direct abortion is a wilful violation of the laws of God, of Nature and of Ethics; hence for the reason of the importance of its object, murder, a mortal sin. Even suppose the mother is in danger of death, abortion is not allowed, for it would be the direct killing of the fetus. To procure an abortion when the fetus is the cause of the fatal illness of the mother is not permitted by a decision of the Holy Office in 1895. For a proportionately grave cause it is allowed to procure abortion indirectly. It is allowed to perform an indifferent act from which a twofold effect may follow, the one good, which is intended, and the other bad, which for grievous causes is permitted. It is never allowable to kill the child to save the mother, or to kill the mother to save the child; but, if the mother be suffering from a fatal disease, not otherwise, it is permissible to give the mother a drug which has for the mother a curative power, or do an operation, as appendicitis, although it may at the same time cause an abortion. But the drug or operation must have a real therapeutic value not to cure the mother solely by causing an abortion. Craniotomy is illicit even if it is foreseen that both the mother and the infant must die, because it is the direct killing of an innocent being. Better that a million mothers die than that one innocent creature be killed. The Catholic ritual prescribes that if a woman die in pregnancy

the fetus should be extracted without delay. An obligation rests upon the physician to perform the Cesarean operation, that the fetus may be baptized and its life saved should it be possible. Every fetus, no matter how much it has the appearance of a corpse (except only in the case when advanced or complete decomposition or putrefaction has taken place) must be baptized. This obligation to baptize exists even when the pregnancy be of but a few weeks, since the human fetus is believed to be animated by a rational soul from the very first moment of conception. An ectopic fetus enjoys as much right to life as any normal conception. It is not permitted to directly destroy an extrauterine pregnancy. It is permissible, however, to cut out the organ which is the abode of the ectopic fetus, if the operation being omitted the mother will surely die, although from it the death of the fetus will ensue. For in this case the death of the fetus occurs only indirectly, since the action does not directly and intentionally affect the fetus, but the organ in which the fetus is enclosed. His Grace, the Archbishop of Melbourne, says: "Risks and dangers are incidental to the married, just as they are to several other states. They are no greater than the dangers of the battlefield, or the mine, the factory or the forest, which are the lot of men. The woman was warned of old, 'I will multiply thy sorrows and thy conceptions, in sorrow shalt thou bring forth children.' If she is not willing to run the risks or suffer the sorrows of married life, let her remain single, but if she enters the married state she must, as a rule, bear with the hardships of her state, or in extreme cases, abstain from the use of marriage." Miscarriage may result from causes so remote as to elude the watchfulness of most conscientious mothers; but some degree of responsibility must attach to a miscarriage which could have been foreseen and prevented; because, anyone who by virtue of his office and condition assumes the care of an object, is held in conscience to such a degree of responsibility for the safety of his trust as will justly compare with its value. There is nothing more precious among earthly goods than human life, and nobody charged more rigorously with the care of intrauterine life than the mother; therefore, the neglect of this sacred trust is a violation of office, not assumed from man, but from God Himself, in matrimony.

DR. BARTON COOKE HIRST discussed

#### THE RIGHTS OF THE UNBORN CHILD FROM THE MEDICAL STANDPOINT.

The right of the unborn child to life is indisputable, but as a matter of fact, this right is more frequently denied during intrauterine life than at any other period of man's existence for several reasons:

1. The inadvertent and often unavoidable loss of life from the spontaneous miscarriage. Statistics show that for every four children delivered at term, there is one miscarriage before the viability of the fetus. It is in this group of cases that much will be accomplished by the present movement in favor of prenatal care. There should be the dissemination to the general public of a wider



knowledge and appreciation of the right of the unborn child to life. This can be accomplished by prenatal clinics, the greatest good being accomplished by this means among the poorer and more ignorant classes. The appalling frequency of criminal abortions is one of the most serious sociologic problems at the present time. The question of the day is whether it is better to prevent conception or to destroy the life which already has been instituted. People the world over apparently are determined to regulate the birth rate by one means or another, for economic reasons, selfishness, love of luxury, disinclination to bear pain, the unmistakable loosening of moral control in the younger generation, etc. Occasionally the sacrifice of embryonal life is not only justifiable, but a duty incumbent upon the conscientious physician. Problems are presented from pregnancy in women suffering from cardiorenal disease, toxemia and tuberculosis. The conscientious physician should be untrammelled in his decision. With a full sense of his responsibility to God and man and a consciousness of the duty he owes his profession he should be allowed to follow the instinct to save life, implanted more and more deeply in the medical mind as his experience grows. Neither the law nor the church, always in arrears in medical knowledge, should oppose an obstacle to medicine's life-saving instinct. Peculiarly, neither the law nor the church condemns the violation of the Sixth Commandment. Has not the woman herself a right to life and the right to demand the sacrifice of her embryo if its presence insures her destruction. In what other light can it be regarded than as the potential murderer of its host, the mother? The decision of this momentous question must be left to the physician.

DR. S. ADOLPHUS KNOPF, New York, considered

#### THE RIGHTS OF THE WIFE AND MOTHER.

To me there is nothing more sacred than the life of the child as it is carried under the heart of a healthy mother; and, only if it cannot be born without endangering the life of the parturient woman can the right of its existence be considered of secondary importance. In this connection I would state that the judicious prevention of conception has nothing whatsoever to do with abortion. Unfortunately our New York State Laws and even our Federal Laws make no distinction between the prevention of conception and the performing of an abortion. It has been estimated that one-third of all pregnancies throughout the country end in abortions. Were statistics available of the mothers, married and unmarried, who are chronic invalids as the result of attempted abortion there would be appalling evidence of the danger of such criminal procedure, and would certainly show the advantage of a more enlightened attitude regarding the means of contraception, at least, for the married women who are enfeebled or diseased. Will any one say that a wife and mother has not the right to prevent the bringing into the world of a child tainted by syphilitic heredity or gonorrheal blindness. In such cases of disease the intelligent mother, wisely instructed by her physician, has indeed, a sacred right to prevent

conception. Statistics which I used before the American Public Health Association show, I believe, that not only the distinctly diseased woman, but the poor woman who has already more children than she can take care of, has a right to use contraceptive methods; also that it is the part of wisdom and a duty to society. The largest family in these statistics was that of an Italian woman who had borne twenty-two children and raised two. The following interesting comment upon this case was made by the Chicago Herald: "Society would have been better off if this prolific mother had borne only two healthy children. The net increase in the population would have been the same. Further, the terrific waste of twenty babies born only to die, the impoverishment due to twenty fatal illnesses, to twenty little funerals, is appalling." In reply to the question invariably asked by some of my opponents, whether the teaching of self-control is not the best preventive measure for family limitation, let me in all sincerity ask whether the teaching of self-control would have accomplished anything in a case such as this? The larger the family of the poor, the more child labor, the more disruption and irregularity, and the more frequently we find a lower standard of life and morals in general. The Hon. John A. Kingsbury, Commissioner of Charities of New York, has said, "In the year 1915 more than ten thousand children were proposed to the Department of Charities of New York City for commitment to institutions. Many of these children are paying the penalty of the social error of *too large families*. If contraception can benefit the born by limiting the unborn, without bringing about any physical or moral deterioration in human lives, I am unqualifiedly in sympathy with it." There can be neither medical, legal, nor moral reasons why the right to be the mother of finer and physically, mentally and morally better children, should not be granted to every wife and mother. That judicious birth control does not spell race suicide but race preservation has been irrefutably demonstrated by the reports from Holland. I know I venture on dangerous ground in the suggestion of a social, moral and economic value in imparting birth control advice to the honest young men and women, physically and morally strong, who would marry did they know they could restrict their family to a few children whom they could raise well. Professor Robert J. Sprague in an address before the American Genetic Association lamented the fact that among the graduates of our women's colleges, only one-half ever marry, and that the average number of children per graduate is less than one. I venture to prophesy that when birth control as a means of encouraging early marriages will not be frowned upon, the greater number of the other half of the graduates who do not now marry will do so and bring at least three children into the world. Dr. J. Rutgers, the great pioneer of this humanitarian movement and Honorable Secretary of the Neo-Malthusian League of the Hague, says that as a result of the League in Holland, "All children you now see are suitably dressed. . . . In the families of the laborers there is now a better personal and general hygiene, a finer moral

and intellectual development. All this has become possible by limitation in the number of children in these families. The best test of our moral, physiological, and financial progress, is the constant increase in longevity of our population. From 1890 to 1899 it was 46.20; from 1900 to 1909 it was fifty-one years. Such a rise cannot be equalled in any other country, except in Scandinavia, where birth limitation was preached long before it was in Holland." In Australia and New Zealand the restriction of families is almost universal. Yet these two English colonies have furnished to their mother country in these hours of struggle the most efficient, and physically and mentally best equipped regiments. And France, of whose low artificial birth rate we used to hear so much, is to-day presenting her splendid spectacle of utter efficiency because only the finest of her people have survived, and the chief factor there had admittedly been contraception. Regarding the fear of depopulation, may I quote Professor Charles A. L. Reed "that the danger to the American family to-day and still more in the future lies in the direction of overpopulation rather than underpopulation." Our population to-day of over one hundred million has been doubling itself on an average of once in less than twenty-five years since 1790. In the State of New York we have observed that the proportional increase among the insane is double that among the sane population. Strange as it may seem there is among the medical profession an element which believes that the matter of birth control does not concern them.

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## REVIEW.

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A REFERENCE HANDBOOK OF THE MEDICAL SCIENCES; Embracing the entire range of Scientific and Practical Medicine and Allied Science. By various writers. Third Edition, Completely Revised and Rewritten. Edited by THOMAS LATHROP STEDMAN, A. M., M. D. Complete in eight volumes. Volume VII, 998 pages, illustrated by numerous chromolithographs and four hundred and sixty-nine half-tone and wood engravings. New York: William Wood and Company, 1917.

"Pacchioni" to "Stone" is the ground covered by vol. vii of this authoritative work. The pediatrician will take especial interest in the articles on anterior poliomyelitis, acute ascending paralysis, rickets, scurvy, hypertrophic pyloric stenosis, pemphigus, status lymphaticus, spina bifida and school hygiene. The obstetrical and gynecological subjects include articles on the pelvis, pelvic inflammation, the perineum, the peritoneum and its inflammations, the placenta, placenta previa, prostitution, puerperal infection, splachnoptosis and sterility. Many of the longer papers are upon matters of general interest, such as radiotherapy and röntgen diagnosis, sarcoma, the physiology of secretion, sewage disposal, poisonous reptiles, and articles on the various tissues and organs—skin, spine, spinal cord, spleen and stomach. No less important,

however, are the brief paragraphs on laboratory methods, skin diseases, climatology and many other branches of medical knowledge. The present volume maintains the standard of its predecessors.

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## BRIEF OF CURRENT LITERATURE.

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### OBSTETRICS.

**Results of Prenatal Work.**—M. M. Davis (*Bost. Med. and Surg. Jour.*, 1917, clxxvi, 5) formulates the definite purposes and means of prenatal work as follows: 1. By making proper medical examination, pelvic measurements, etc., of pregnant women, before confinement (when possible, some months before), to decide whether normal delivery is possible or likely, and to give such medical advice as may be indicated for the comfort and safety of all women, and in particular when hospital care and operation are necessary. 2. By visits from a trained visiting nurse and reports to the physician, during the course of pregnancy, to instruct the mother and father in the hygiene of pregnancy, and to make the best possible preparation of the home for the sake of the coming child. 3. By expert medical care at confinement, to minimize the risk of delivery to mother and child. 4. By frequent visits from the nurse during the two weeks or so following confinement, to provide needed bedside care to the mother and give the baby the best start possible. A comparison of the death rates of 731 babies whose mothers received prenatal care in five wards of the city of Boston during the two years 1914 and 1915, shows that the death rates were reduced to one-half or one-third those found among babies not receiving prenatal care in these wards during the same period. This reduction is found among babies during the first week of life, during the first month of life, and during the first year of life, taken as a whole. The proportion of stillbirths, in each year, is only half that among the general population. As it is known that only a small proportion of these babies received any other organized medical or nursing supervision, the reduction in death rate is apparently to be attributed to the prenatal work.

**Causation of the Naegele and Roberts Pelves.**—D. B. Hart's (*Edin. Med. Jour.*, 1917, n. s. xviii, 4) theory of the causation of the true Naegele and Robert pelves is that they have not had a previous ostitis with resulting ankylosis in the region of the sacroiliac joints, followed by disturbed weight transmission. The pseudo-Naegele and pseudo-Robert pelves have had a previous ostitis in these regions, and there the synostosis and atrophy are the result of this. The forms of the Naegele and Robert pelves are the result of polar losses of the size elements of the alæ sacri and innominate bones, due to maturation of the sperm- and germ-cells. In these, a loss of alæ sacri and innominate determinants has occurred, a great rarity, more often a unilateral loss (Naegele) than a bilateral

one (Robert). The sacroiliac ankylosis is due to the fact that by such losses (bony elements and joint elements) the part remaining, imperfectly developing, becomes ankylosed. As this is a germ-plasma change, and multiplication of the reduced elements occurs, it may be transmitted.

**New Method of Acidosis Therapy.**—It is generally believed that the alkalinity of the blood of a normal person is fairly constant and unalterable. A. O. Gettler and E. Lindeman (*Jour. A. M. A.*, 1917, lxviii, 594) have attempted to show that the alkalinity of the blood of a normal person can be greatly increased and point out the feasibility of such alkalization of the blood of a normal donor to enhance its therapeutic value in blood transfusion for the treatment of acidosis. The reaction of the blood before, during and after alkali ingestion was carefully determined by three independent methods. All tests (H ion content, alkaline reserve by carbon dioxid determination, and bases actually present) showed that the alkalinity of the blood may be appreciably raised by our method. The highest increase in alkali reserve was 37 volume per cent. or an actual increase of alkalinity of the blood of 74 per cent. This maximum blood alkalinity is obtained between twenty and forty minutes after administration of alkali, reaching the greatest height in about thirty minutes. It quickly subsides thereafter. In acidosis therapy with sodium bicarbonate, the alkali should be given in small doses at regular and very short intervals, rather than in large doses once or twice daily. The generally accepted routine of frequent urinary analyses during the whole period of pregnancy in private cases should be supplemented by analyses of the blood, since it is a more accurate test in the determination of the condition of the patient. Not only should the blood of the donor and the recipient be compatible, but also, as illustrated by the writers' case of acidosis, in which for the first time so far as known the donor has been pre-alkalinized, the blood of the donor should be alkalized by large doses of sodium bicarbonate before transfusion. By the method of syringe transfusion we have a comparatively simple and safe means of treatment. The timely use of this treatment may obviate the necessity of emptying the uterus in cases of acute and severe acidosis complicating pregnancy, and may be employed in other severe conditions of acidosis not complicated by pregnancy. In alkalizing the blood of a donor for blood transfusion in a given case, the blood should be transfused about one-half hour after administration of the last dose.

**Fibroids and Pregnancy.**—B. Solomons (*Med. Press*, Jan. 10, 1917) says that when myoma causes sterility it is usually submucous in variety; but myoma is one of the least common causes of sterility. When performing myomectomy with pregnancy in view, if the edges of the wound are approximated carefully with No. 4 iodine catgut, the confinement may be approached with confidence. After myomata are removed during pregnancy, miscarriage is a common outcome. When multiple fibroids complicate pregnancy hysterectomy is usually necessary.

**Les Surprises du Curettage Explorateur et le Diagnostic du Cancer de l'Uterus.**—M. Muret (*Annales de Gynecologie et d'Obstetrique*, Tome xii, Nov., Dec., 1916, p. 321), entitles his article "The Surprises of Uterine Curettage for Exploratory Purposes, and the Diagnosis of Cancer of the Uterus." The findings are grouped by him as follows: (1) The diagnosis of cancer of the uterine fundus has been rendered on the basis of the histological examination of the curetted material, but the uterus after extirpation presents no trace of malignant disease; (2) exploratory curettage yields a positive result; examination of the extirpated uterus, although negative at first, leads after long and careful investigation, to the discovery of some trace of carcinoma; (3) a positive curettage is not followed by a radical operation, but the patient nevertheless remains well; (4) Curettage is negative, whereas the examination of the extirpated uterus reveals the existence of a carcinoma which has escaped the curet. Observations of this kind possess considerable theoretical and practical importance: Ladinski (*Surg., Gyn. and Obs.*, xx, 1915) has published a very complete article on this subject with nineteen cases from the literature and three personal cases. A number of illustrative cases are added to this list by the author (Muret). In the first group are included those cases in which the curettage proves positive, whereas the extirpated uterus is negative on examination, macroscopical as well as microscopical. In three typical cases, occurring in patients of thirty-one, forty-six and fifty-seven years of age, respectively, the diagnosis of adenocarcinoma of the uterus was rendered by pathologists of wide experience, after the curettage; the extirpated uterus presented only the lesions of chronic metritis. It would seem that in very exceptional cases, the curet may accomplish a complete removal of a carcinoma of slight depth and surface extent, in its early stage; or of a carcinomatous polyp, with a pedicle. This was illustrated by the author's fourth case, concerning a woman of sixty-three years, whose uterus was found entirely free from cancer, after extirpation by the vaginal route, although the exploratory curettage had led to the diagnosis of adenopapillomatous cancer of the uterine fundus. Two years later, a metastatic tumor made its appearance in the form of a papilliferous adenocarcinoma of the left ovary and the patient succumbed. Facts of this kind prove the possibility of complete extirpation, by means of the curet, even of a nonpedunculated adenocarcinoma of the uterine mucosa. A number of cases have been reported in the literature, the carcinomatous polyps whose pedicle and surface insertion on the uterine mucosa were free from all epitheliomatous lesions; such as the case of Opitz (———, page ——) which is not mentioned by Ladinski—as well as those of Winiwarter, von Graff, Prym, Ruben, Ladinski (1913-14) Ladinski (1914, No. 31). The clinical symptoms, menorrhagia or atypical bloody discharge, may also be referable to an associated metritis or to a benign polyp, as in the observation of Rubin-Ladinski. In certain rare cases, the exploratory curettage is positive, and the examination of the uterus, although negative at first, finally leads

to the discovery of traces of carcinoma. In a case observed by the author, concerning a woman of forty-nine years, the clinical symptoms were in no way suggestive of malignant disease, and in spite of the positive outcome of the curettage, also in spite of the carcinomatous appearance of a certain region in the extirpated uterus, the histological demonstration of the malignant lesion proved extremely tedious and difficult. Cases of this kind serve to show that the extirpated uterus should not be pronounced as absolutely intact unless it has been completely examined in serial sections. This group of cases, in which the positive curettage has not been followed by a radical operation, the patient nevertheless remaining well, comprises four cases, those of Krukenberg, Vassiner, Hess and *Ladinski-Boldt*(2) 1915 (*Ladinski* No. 2) (1915) to which the author is enabled to add a personal case, on a woman fifty years of age. The cases of Krukenberg and the author concerned polyps, and *Ladinski*, claims the same for his case, judging from the volume of the curettage-débris, however, *Boldt* who saw the same patient later and studied the specimens, is not of this opinion and regards this case as altogether exceptional, on account of the deep penetration of the epithelioma into the uterine mucosa, which he considers as the proof of the existence of a noncircumscribed and long-standing process. This assertion of *Boldt* does not seem to the author, (*Muret*) to be absolutely contradictory to that of *Ladinski*, for one might admit that this penetration of the carcinomatous proliferation took place into the fibromuscular tissue which is often encountered in uterine polyps, and not necessarily into the muscular tissue of the uterine wall. Subsequent curettage, fifteen days and three months later, yielded an absolutely negative result in *Ladinski-Boldt's* case. The duration of the cure at the time of the report was one year. In a small group of cases, finally, the curettage proves negative, whereas the examination of the extirpated uterus permits the demonstration of a carcinoma which has escaped the curet. *Ladinski* quotes an interesting observation by *Semon* (1910) in which a very early incipient cancer was so well concealed by a submucous fibroma situated in front of it, that a very complete curettage had failed to reach it. A number of cases belonging to this group probably remain unpublished. In a personal observation of the author's, concerning a woman of forty-two years of age, the only region where the mucosa was diseased and ulcerated was situated in a tubal angle, so that the curet was unable to reach it. A spherical tumor was extirpated from the lower segment of the uterus, and on histological examination was found to be an adenocarcinoma. Hysterectomy was performed, and the uterus was found to contain two cancerous foci, separated from each other by healthy tissue, and so situated that a repeated curettage on the date of the radical operation would have yielded a negative result. In view of the rather slow development of cancer of the uterine fundus, the patient would have been apparently cured during a certain length of time, without the operation, from which she made a good recovery. Curettage of the uterine cavity, performed as thoroughly as pos-

sible, with the object of histological examination by a pathologist of experience, is and remains the best and most reliable method of diagnosis in carcinoma of the uterine fundus, also, and especially, in its beginning. In very exceptional cases, the curet may remove as a whole a carcinoma of slight depth and surface extent, such as it exists at the onset; or a carcinomatous polyp whose base or pedicle are free from cancer. Those very exceptional occurrences let us admit the possibility of an apparent or even a complete cure after a curettage with positive findings, but not followed by a radical operation. In case a radical operation is performed, the uterus may then be found free from all traces of carcinoma, as shown by a complete examination of the organ in serial sections. These are intermediate cases in which the uterus, although apparently intact, still contains a few fragments of the malignant neoplasm, more or less difficult of demonstration. These exceptional cases, no matter how favorable they may appear, do not protect the operated patients absolutely against ultimate metastases in other organs. They are useful to know, in spite of their rarity, for it is noteworthy that they are not necessarily referable to errors in diagnosis, their existence having been scientifically established. Exploratory curettage, when it yields a positive result, always gives the indication for a radical operation, even if it should be followed by another curettage, with negative findings. In a few exceptional cases, an incipient and circumscribed epithelioma may be situated in such a way as to escape even a very complete curettage. From this fact it results that in the presence of negative or doubtful findings in an exploratory curettage, with suspicious clinical symptoms, the latter alone may properly furnish the indication for operation. In view of the "surprises" frequently revealed on examination of the products of uterine curettage, every curettage must be followed by a histological examination performed by a competent specialist.

**Hyperthyroidism and Its Relation to Certain Pelvic Disorders.**—The ovary, says T. B. Eastman (*Jour. Ind. State Med. Assoc.*, 1916, ix, 465) is a gland of double structure—the corpora lutea and the interstitial cells. There is a close physiologic interrelationship between the ovaries and the thyroid. In certain circumstances any affection of either one may produce abnormal conditions in the other. Thyroid secretion and ovarian secretion do not supplement each other, they neutralize each other. In our study of disease, particularly of glandular structures, we must not fail to consider the biochemistry, normal or abnormal, involved in a given case. In cases presenting symptoms pointing to both these structures only the most careful study will point the direction of proper surgical attack.



# DEPARTMENT OF PEDIATRICS.

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## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON PEDIATRICS.

*Stated Meeting, Held March 8, 1917.*

DR. ROGER H. DENNETT, *in the Chair.*

DR. CLARENCE PAUL OBERNDORF read a paper entitled

#### THE EMOTIONAL LIFE OF THE CHILD.

Many accurate descriptions of the emotional reactions of children have been written, but authors have been generally content with recording what they observed, without attempting interpretations of their findings. Broadly speaking they all recognize that the emotional reactions in infancy are dependent upon pleasurable or painful sensations which the infant experiences as the result of his act. Thus Campayre writes "The first pleasurable sensations originate in the progressively moderate use of the organs of sense and the gratification of bodily wants."

It is in the light of Freud's theories that we shall view the emotional life of the child. Antedating Freud, in 1879, Linder called attention to the fact that the infant often practises suckling with an eagerness which completely absorbs its attention even though its appetite for food has been completely appeased. He also emphasized that at times this suckling, independent of the appetite for food is performed with a progressively increasing intensity, which culminates in a climax that resembles an orgasm. After such an episode the child often falls quietly asleep presumably as the result of gratification from this act in itself even when hunger was not in question. He even ventured the opinion basing his idea upon grasping movements which he noted that some infants performed with their hands during such sucking, which it seemed best to designate as "culminative" suckling, that this act constituted a fleeting, transitional forerunner of future masturbation. Freud accepted this sexual conception of culminative suckling but pointed out that the suckling was not primarily objective, that it was not due to any pleasure derived from the action by the infant upon the mother but was rather autoerotic, dependent upon the pleasure which the infant experienced from its own lip and mouth movements. In

the second place he maintained that this culminative suckling was not an independent manifestation, but was closely associated with that suckling which the child first learned to satisfy its hunger. Culminative suckling should thus be considered as an altered form of the necessary and agreeable sensation connected with hunger suckling. In the third place the fulfillment of the culminative suckling is dependent upon the erogenous sensibility of the zone composed of the mucous membrane of the mouth and lips. Freud also agreed that the erogenous quality of the labial mucous membrane varied greatly in degree in individual children for it was quite obvious that the tendency to suckling independent of food intake was strikingly variable in infants. Freud also described a double function to the evacuation of the intestinal tract. He believed that excretion from the canal, aside from its accepted physiological function, not infrequently served the young child as an autoerogenous source of pleasure. He asserted that those sensations which necessarily accompany defecation are so agreeable to some children that they attempt to repeat them, or by "holding back" attempt to prolong the sensations accompanying the act. The anal zone and the acts performed in connection with it also varied their erogenous significance with the individual.

Before going further it may be well to explain that in discussing Freudian psychology the term "sexuality" is used in its broad significance and not as limited to the genital system. Thus during the first few months of life according to the psychoanalyst school, the chief source of pleasure for the infant are almost exclusively dependent upon the movement of its own muscles and from its own mucous membranes, and these latter are considered as of rudimentary sex significance. Intimately associated with skin and muscle erotism but appearing at a somewhat later date is the pleasure won by the child from the earliest precursors of inflicting and submitting to pain, such as biting the breast, having its cheek pinched, etc. Although in very early life each of these tendencies is very meagerly developed, later they are definitely incorporated into the service of sex for the purpose of procreation.

The sense of taste is undoubtedly of later development. In suckling the satisfaction of the infant seems to be in no way dependent upon taste, but is rather a matter of mucous membrane erotism.

The sense of smell is evoked at about the same time as the sense of taste. To smell a flower and to taste it seem to be consequent actions for the child. With the development of the sense of smell comes an interest in the products of defecation, which at an early age may arouse no disgust. Another phase of the defecation process is the attention and importance which the child early begins to recognize is attached by his attendants to the act. Moreover he finds in it a means by which he can invariably summon his mother or nurse to his side, thus gaining an amount of attention which might not otherwise fall to his lot. As is well known many adults show an unusual interest in excrement.

One usually learns from retrospective anamnesis that such per-

sons found much interest in the excretory processes in childhood or possessed the idea that the rectum was directly connected with sex relationship and birth. If we grant that the psychic life of the very young child is influenced by all the primitive functions of its little body it is reasonable to assume that the child will attempt to reproduce that which had given him pleasure and avoid that which is unpleasant. Perhaps if the baby could formulate its sensations after it emerged from the relatively undisturbed warmth and protection of the mother's womb it would wish that "it had never been born." It is upon this basis that during critical emotional periods of later life the individual may be afflicted with pertinacious mother attachment, and may find definite fancies of solace and shelter which return to the mother's womb would afford.

From these primarily instinctive processes are later developed acts of will. The will of the very young child always expresses itself in the act. Before he begins to speak he makes known his wishes through grasping, crying, struggling, etc. He knows no compromise and opposes whatever tends to restrict his freedom of action. Among the earliest expressions of infantile will is that of opposition to the will of his environment which so very soon clashes with his own. Even during the first year of life the child is compelled to suppress his will to such an extent that it is not surprising that outbursts of anger and defiance should appear. Here for the first time the parents come into contact with pedagogical problems and it is evidently no easy matter to choose the correct balance between exaggerated strictness and excessive tenderness, both in the early years and in adolescent life. While unlimited indulgence is usually meted out to the first or to an only child, late comers sometimes meet with harsh and punitive discipline and an absence of love that is not without its lasting influence through life.

Pride, a desire for independence, is one of the most important stimuli for activity of the will in children. Children like to be admired by their environment. This may be viewed in the light of an exhibitionistic trend, one of the most powerful traits in childhood.

Another source of intellectual activity we may designate as sympathy or love. The child begins to recognize persons intimately connected with the care of his person and this recognition constitutes an intellectual act. Intellect and emotion are especially closely connected in the child and the sooner intellectual powers develop, the more intense is the emotional life. Just as there is an association of ideas of sympathy for the protecting mother or nurse, so too, there may be an association idea of antipathy for a person who, like the physician, depresses the tongue to look at the child's throat. Such an impression never entirely fades, but is carried on unconsciously, a fact only partially recognized by educators.

Among the earliest intellectual processes one may mention imitation, with all the joy attendant upon success and speech which is preceded by babbling. This latter Freud considered largely an autoerotic manifestation, dependent upon the pleasurable stimuli from the mouth and tongue muscular movements.

From this outline it is evident that the child is occupied chiefly and unrestrainedly with the gratification of its own desires and necessities. It secures most of its enjoyments from the pleasurable stimuli it receives from its own body or bestowed upon it by others. From the point of view of character development this is of paramount importance for it is very common to find this type of autoerotic emotional make-up persisting through late adult life with the result that such individuals find themselves out of harmony socially with normal persons who have emerged from this stage through which all must pass. The cause of this maladjustment may remain quite unconscious to such a person but their love life continues to center in themselves or goes one step further and remains fixed on someone like themselves, that is someone of the same sex.

If this be true it would seem from an educational standpoint that the early encouragement of responsibility for the child is contributing as well as receiving all from the family commonwealth is desirable. Interruption of infantile emotional ties between children and parents at a reasonably early age is an advantage to both.

#### DISCUSSION.

DR. HERBERT B. WILCOX.—Dr. Oberndorf's remarks on emotion as applied to child life, have rather inseparably coupled interpretation of such emotion with pleasure, in particular to pleasure of a sexual nature. Whatever the psychoanalytic interpretation of the term "sexual" may be, it must ultimately refer to elements which are, to my mind, as yet usually dormant in the patients of the age that we are dealing with to-night.

Pure psychology has small place in the activities of the pediatrician, excepting as it is applied by him to the parents with whom he deals. Physiological psychology, however, as applied to the neuroses and habit spasms of children plays a very important part in his work.

I wish to take up the question of emotion in children, particularly and only as to its influence upon their habits and routine life.

To my mind thumb-sucking has really no relation to the question of food, or of sexual pleasure, or of emotion, although the child at first may suck his thumb because he unconsciously expects to get nourishment from the process. Before long, however, he learns the fallacy of this belief, and then the process of thumb-sucking becomes purely a habit unassociated with the ingestion of food, and to my mind quite apart from any idea of erotic sensation. Later on this habit may become influenced by the development of some emotional association in connection with it. I have not seen yet, however, the substitution of any of the less desirable habits for that of thumb-sucking, when the latter has been made mechanically impossible. The point has been raised with me at times by neurologists whose children I have treated, as to the advisability of interfering with the habit of thumb-sucking on account of the possibility of the substitution of some other more serious habit in its place. It is, of course, quite possible that this occurs at times; it has not been a factor in my experience.

It is fortunate that Dr. Oberndorf has given us the lead he has, as the psychology of the child, and that of the parent's relation *toward* the child, should always concern the pediatrician.

It is often, for instance, far easier to prescribe a proper and adequate diet for a child, than it is to overcome that child's objections to taking it. In the same way one can much more readily advise as to the sleep and exercise necessary for a given age, than furnish a method of making the infant go to sleep when put to bed. Dr. Oberndorf has spoken particularly of the *emotional life* of the child. Dealing as we are most frequently with younger children than he comes in contact with, the emotional life is of interest to us principally in its application to the formation, or interference with the formation of regular habits. In other words, from our standpoint, it is a question of the *abnormal emotion* influencing the *normal* habit. This applies directly to the suppression or prolongation of the act of defecation as referred to by Dr. Oberndorf as being an emotional element entering into and disturbing what should be an habitual response to a distended intestine, plus the increased peristalsis arising from the ingestion of food.

It is clear that the matter of expulsion of the intestinal contents should be, and is under proper guidance, purely a matter of habit, occurring at a regular time, and such a time as is most favorable to success; this time being shortly after a meal, when as it is well known, peristaltic action is stimulated by the full stomach.

The infant, and the child up to perhaps eight years, is or should be, largely a creature of habit; habit established from within; physiologically, from without, governmentally. Habit, and a more or less unquestioning submission to routine, are the normal factors determining a child's reaction of his environment. When emotion enters largely into his life, then he tends to become distinctly abnormal.

I wish to apply this question of emotion and habit to only one phase of child life. That is in relation to the matter of the ingestion of food. Emotion *versus* habit, is perhaps most often illustrated in the eating habits of the child from eighteen months on. As a habit, appetite should normally be the result of an impulse to fill a vacuum with *substance*, not a food selected for the purpose of giving gustatory pleasure, or of incurring the approbation of the urging, adjacent parent or nurse. When emotion comes to enter into the question of eating, it usually is an expression of the desire to attract attention, and to occupy the center of the stage through some impulse in relation to food, other than that of satisfying appetite.

The habit of becoming hungry at mealtimes only, and then eating to avoid the discomfort of subsequent hunger, rather than to produce pleasurable sensations, represents a good digestion, and has nothing to do with emotion. The meal eaten as a result of coaxing, urging or bribery is a poor substitute for a normal attempt to neutralize gastric secretions.

We have all been asked the question "Doctor, how can I make my child eat? He does not take enough food to keep a bird alive." The answer is simple—"Don't try to make him eat. What he

doesn't eat cannot hurt him. Leave him alone until such time as he gets hungry, and then make his food allowance small enough to keep him hungry and eating periodically to satisfy that hunger."

This involves the general principle that a child should form his habits of life, not by following suggestions, advice or orders, but by himself discovering that deviations from a certain routine, result in discomfort. If he once gains this idea himself unaided, it will stick. If he simply accommodates himself to necessity he will cease to follow his routine the minute the necessity ceases to be imperative.

There is no group of cases that offer more interesting problems of diagnosis, or present more spectacular results, than those children who come to us because of poor appetite, and suffering from constant irritation through urging, coaxing and arguing at mealtime, and who naturally present as secondary symptoms of that, bad assimilation, anemia, and digestive derangement. These conditions cannot be corrected by digestive aids, or purely medical treatment. The basis of their trouble lies in the fact that they take their food under conditions of nervous unrest due to interference, and in the fact that they usually specialize on some type of food, thus throwing off the balance of their food elements.

Emotion has now entered meal time in this way:

The child refuses to eat from obstinacy; a very natural result of too much urging and coaxing, or later, because he emotionally enjoys the attention he attracts. This illustrates the antipathy association spoken of by Dr. Oberndorf.

So long as attention is paid to him, so long he will strive to attract it and refuse his food.

When the abnormal stimulus is removed, and no one any longer seems to know or care how much or little he eats, he will find it dull playing the clown without an audience, and return to his habitual response to a physiological need.

DR. WILLIAM B. NOYES.—I did not hear the paper but was very much interested in the last discussion. In this room two nights ago we listened to a very remarkable paper by Dr. Glueck who is making a study of the criminals at Sing Sing prison and there was barely a reference in the entire discussion to the development of the emotional life of the child. The many characteristics of the criminal were reviewed and they showed many traits of normal and abnormal children. There are three methods of psychological study that we recognize at the present time. These are: 1. The old-time method of distinguishing mental faculties as though they were in separate boxes, as attention, memory, judgment, emotions, volition, imagination, etc., a method which is less followed at the present time because we realize that all the different mental faculties are so closely associated that they cannot be thus separated. 2. The Simon Binet method by which abnormal children may be distinguished from normal ones; by comparing the defective child with the normal standard for a given age we can tell what age the mind has reached. This method gives very brilliant results in young children, but after the child has reached the age of eleven or twelve

years it is not satisfactory. 3. The genetic method, or the study of the mind from the standpoint of development. All phases of delinquency, psychological and neuropsychological were reviewed but what was lacking and what you would instinctively have grasped was a study of the characteristics in criminal and delinquents which every child normal and subnormal shows. In the criminal there are lapses or temporary returns to the mental characteristics of childhood. In the kleptomaniac or the person who plays with fire we can trace the mental defect to a remnant of submerged sex conflict. Many of the mental conflicts that occur after puberty may be traced by the psychiatrist to a submerged sex conflict; but there are many phases of delinquency which do not need the psychiatrist to interpret them; they are exaggerations of emotional characteristics of the infant and the child every pediatricist is familiar with.

It is difficult to draw the line and to say just where certain characteristics cease to be desirable and become abnormal. Take for instance the "Gang spirit;" what can be more admirable than for a boy to be loyal to his friends and to stick to them in games and work, to be helpful, and never to "blab?" Yet just how different is this from what the boy in the gang does? A different environment places them in a bad set of boys. He either follows a leader or is a leader; if he is amenable to suggestion he follows a leader and we have the basis of much that is known as delinquency and yet is there anything abnormal in it? In the same way one may run through a whole series of traits in the boy, the girl or the adolescent and find difficulty in saying just when these traits become abnormal.

We are often hazy when it comes to diagnosis and we like to follow sharp cut labels. Thus frequently in discussing delinquency we use the term "instability." The French use the word "Débile." A still broader psychological term is psychological constitutional inferiority. While these terms may not be definite they all hark back to the first three or four years of life. The unstable child may not be defective in structure of brain and essential mental faculties, but the unstable child will ultimately be shipwrecked if it is not controlled and the time to control it is about two generations back.

DR. HORACE W. FRINK had been very much interested in Dr. Wilcox's remarks as to the necessity of establishing in the child proper habits of eating. From observations made from another angle—namely, the study of disturbances of appetite in neurotic adults—he could confirm Dr. Wilcox's statement that every care should be taken to avoid getting the child in the habit of refusing food as a means of getting extra attention and sympathy.

In reference to Dr. Oberndorf's paper, he felt that perhaps some might have been baffled as to why such phenomena in the child as thumb-sucking and the holding back of feces should be called sexual. He wished to emphasize that this term had been given to them as a result of studies made upon adults who suffered from some disturbance of the evolution of the sex instinct—psychoneuroses or perversions. In retracing through the life history of the individual the development of, say, an oral perversion one found clearly

apparent that the condition had developed by almost insensible gradations out of something apparently very innocent and which was to be found in even the normal child—namely the pleasure sucking to which Dr. Oberndorf referred. In other words, these infantile phenomena were named not so much on account of what they displayed to direct observation, but rather on account of what is pathological cases they might develop into. The term sexual as applied to them had, of course, a very different implication than is usually given to it in ordinary speech.

He also called attention to the fact that we need not be surprised by the statement that an organ such as the mouth or anus can serve two functions, an alimentary and a sexual one. The same is familiarly true of other organs of the body, the eye for instance, which though it has a great many nonsexual functions, is nevertheless one of the most important sensory organs for the reception of sex-stimuli.

DR. FRANK WADE ROBERTSON.—I may be old fashioned as I do not adhere strongly to psychanalysis. I think that in many instances we lay too much stress on apparently insignificant things. We cannot always find out about the emotions of a child by judging them by the emotional standards of the adult. As far as the thumb-sucking and feces are concerned, I think the thumb-sucking usually is merely an incident in the child's life, and the questions brought up in connection with the feces I would explain by the fact that the child regarded defecation as a disagreeable duty and put it off as long as possible to continue his play and I cannot see the modern idea of sexuality in it.

I have also another old-fashioned belief, I think that probably sometimes a properly administered spanking would solve the problem and correct the bad habit. The parents are largely responsible so far as the emotions are concerned for the emotional exacerbations. If we consider the emotional life of the present day we are not surprised that the child should manifest abnormal emotional traits. We have to-day no rest in the home. The mother is dashing away to the milliner, the dressmaker or a bridge party and she may get home for dinner if the game is over in time; the father is occupied with business affairs and there is no cohesion or order in the family life. The children seldom see the parents and are brought up by nurses and attendants. We should teach that there is no holier duty for a mother than to properly bring up her child and to impress her ideals on the child. We should remember that early impressions endure as long as life lasts and that it is most important that correct ideals are cultivated from the first.

DR. SAMUEL W. BANDLER.—The paper was very full of truths, some of which we have read and which are known and some that are new. This room should be full of physicians whose purpose it is to educate the public. Some are parents as well as physicians and it is to the parents who are not physicians as well as to the physicians who are parents that a knowledge of the emotional life of the child is important, but I would like to ask if we are not failing to recognize



the importance of heredity when we consider the emotional life of children.

DR. OBERNDORF, in closing.—Dr. Wilcox has brought up a question which is a very difficult one to solve in later life in people who show neuroses, and that is the attitude of the parent. The parents of the neurotic adolescent continue to be of the same mental caliber as when the child was born and furnish the most difficult factor in the treatment of the young adult.

I very recently had a case that illustrates this point. The patient was a youth of nineteen who had a compulsion neurosis. The mother made him discontinue treatment because she said I told the boy to come out to see me on a cold day. Also she said she thought the boy was well. In reality she did not want to be separated from the boy. She had such an attachment for him that if he was restless at night, she could not resist the temptation to remain with him for the rest of the night. In the case of the teacher with the pertinacious "mother-attachment" which I mentioned in the paper, though she was thirty years of age, the mother came to her room every morning to spend a half hour in fondling her.

The pediatrician has the opportunity to anticipate the psychiatrist and to instruct the parents of the dangers of excessive cold early in the life of the child.

Thumb-sucking is, as I said, autoerotic. I would like to cite an interesting instance in which a tic had developed which reverted directly to the habit of thumb-sucking. The boy, aged ten, suffered from a compulsive movement of raising his arm with the thumb projected into a position for sucking and then taking it away. This boy taken from the mother's breast and was admitted to Willard Parker Hospital when one year of age. There he ran the gamut of children's diseases, remaining during the greater part of the second year of his life. While in the hospital he developed the habit of cumulative thumb-sucking and clung to the habit until he was six years old. Later children in the street recognizing such a habit as infantile taunted him by calling him "Abie the sucker." He tried to break the habit with the result that he developed the tic of making a movement as though he were going to put his thumb in his mouth and then inhibiting the act. His father had assisted him in the effort to break the habit, by giving him ten cents a week. This the boy invested on hard candies on which to suck everlastingly, a rather poor substitute. In thumb-sucking psychologically the pleasure was based on autoerotism. Later masturbation was a similar autoerotic manifestation. Dr. Oberndorf believed this to be a normal transitional stage through which most children passed before reaching adult heterosexuality.

Autoerotism varies with the individual. Harping on heredity does not help one to correct the present. As far as heredity is concerned, we must let that matter stand and look to the future.

What Dr. Robertson had said with regard to holding back the feces as being an attempt to delay a disagreeable act I do not agree with, I rather think evacuation must be considered a pleasurable

act. It would be a very unusual thing for a child to try to prolong any disagreeable act. For children as well as adults usually avoid disagreeable acts; the child probably gets a certain amount of satisfaction through holding back the stimuli from the anal zone.

Concerning Dr. Noyes reference to the work of Glueck at Sing Sing, this would prove valuable principally as a laboratory investigation rather than valuable in the sense of being beneficial to the individual investigated. If a man of Dr. Glueck's ability could be employed to help supposedly normal people solve some of their maladjustments it would perhaps be of greater benefit to the community. The study of the criminal adult might yield some light on the best methods for meeting such tendencies in the very young.

Dr. Oberndorf said one of his favorite hobbies centered in the belief that the time would come when every high school child, or even common school graduate, would be given a thorough overhauling psychologically just as he was now given a physical examination. This would be for the purpose of determining his fitness for a particular line of work, straightening out of mental kinks, and of directing his future activities in life.

DR. CHARLES HERMANN read a paper entitled

#### THE ETIOLOGY OF MONGOLIAN IMBECILITY.

Various authors have considered as important factors in the causation of Mongolian imbecility, worry, emotional shock, and disease of the mother during pregnancy. However, many mothers of children showing this condition give no such history, and a very large number who have had trouble during pregnancy give birth to perfectly normal children. Nature in her desire to preserve and protect the species protects the germ cell most carefully from all injurious influences. I wish to present the pedigree of a family which has come under my observation. The mother of the patients J. G. and A. G. was married twice. By her first husband she had one perfectly normal child; by her second husband, the first child was a Mongolian imbecile, the second a perfectly normal child, and the third a Mongolian imbecile. The parents were both healthy and the mother was perfectly well during all four pregnancies; she had no worry or shock. Shuttleworth mentions the case of twins, in which the male was normal, the female a Mongolian imbecile. In these instances it is hardly conceivable that a constitutional disease in the mother could be responsible either for the alternately normal child and the Mongolian imbecile or how it could affect only one of twins and not the other. Immaturity or exhaustion of the generative organs especially of the mother has been given as a cause of Mongolian imbecility. A certain percentage of the mothers of Mongols are very young or very old. In about one-third the mother is over forty years of age. There are however about two-thirds in which the mothers are between twenty and forty years of age. Large numbers of perfectly normal children are born to mothers over forty, and there is no evidence to show that such children are

weaker physically or mentally than those of preceding pregnancies. In about 50 per cent. of Mongols, the child is the last of a series, but it may be between two normal children or be the first child. Adverse conditions affecting the maternal reproductive organs may possibly act as predisposing, but they cannot be the essential cause of Mongolian imbecility. Again, pressure on the basal ganglia, as shown by the short anteroposterior diameter of the skull, the flat occiput, and the diminished weight of the cerebellum, pons, and medulla has been assigned as a cause of Mongolian imbecility. Here there is a possibility that there is a confusion of cause and effect. Congenital syphilis has been suggested as a cause of Mongolian imbecility. The investigations of twelve authors representing a study of 3872 cases of mental defectiveness found 9.1 per cent. giving positive Wassermann reaction. There seems to be no definite relation between syphilis and Mongolian imbecility either as regards the Wassermann reaction or the clinical evidence of the disease. Shuttleworth found clinical evidence of syphilis in only four of 350 cases. While frank cases of congenital syphilis are common I do not remember seeing a single case which presented the manifestations of Mongolian imbecility. On the other hand, during the last eighteen years I have had over 100 cases of Mongolian imbecility under observation. Granted that in a few the disease was latent, if there was a causal connection, we would expect some to show distinct lesions. When there is a syphilitic infection in a family, the first children usually present marked manifestations, and the severity of the symptoms tends to diminish with each pregnancy; in Mongolian imbecility it is frequently the last child and the last child only which is affected. Stevens thinks it probable that syphilis acts primarily on some of the endocrine organs, possibly the pituitary body, though the characteristic facies may occur independent of an involvement of the endocrine organs. It is true that disturbance of the pituitary body may cause changes in the bones of the skull and face, but not all such changes are necessarily due to lesions in that organ. The dwarfing in Mongolian imbecility is not usually marked and is not to be compared with that in congenital absence of the thyroid gland. In some of my patients it was not as great as that associated with conditions which are quite independent of primary disturbance of the ductless glands, such as congenital heart disease and the intestinal infantilism of Herter. Postmortem examinations in Mongolian imbeciles have not shown any characteristic changes in the thyroid, thymus, or suprarenal bodies. The administration of these extracts in Mongolian imbeciles has not been followed by marked improvement.

There is one feature upon which I believe more emphasis should be placed, namely, the frequent association of Mongolian imbecility, with other congenital anomalies. Besides the more common ones, congenital heart disease, strabismus, and anomalies of the palate, ears, fingers, and toes, I have also had two cases of congenital cataract under my observation. There are comparatively few of these patients who do not show some anomaly. Many of these

deformities are known to be inheritable according to the Mendelian laws; many others are probably transmitted in this way. It is not plausible that the association of these anomalies with Mongolian imbecility in the same individual is not merely a coincidence, but that the peculiarities of the brain, skull, and face are dependent on similar causes, and that they are also inheritable according to the Mendelian principles? According to these principles a "carrier" may be defined as an individual who had within him the peculiarity or unit character in a concealed, latent, or recessive form, so that although apparently normal, he may transmit this characteristic to his offspring. He is not unlike the "carrier" in the communicable diseases who although free from the disease himself, may transmit it to others. Goddard's graphic charts show that the Mendelian theory has proven true as regards feeble-mindedness. The chart shows why a feeble-minded child only results when a carrier mates either with a feeble-minded individual or one carrying the same unit character as himself. Thus we see why there is greater danger in the mating of cousins, if there is a defect in the ancestry, because having grandparents in common there is more likelihood that they are both carriers, though they may appear perfectly normal. Goddard does not include Mongolian imbecility in the hereditary form of feeble-mindedness, but thinks its sole and adequate cause is in the condition of the mother during pregnancy, yet it has already been shown how unlikely it is that the condition of the mother is responsible.

All observers have pointed out the difficulty of getting complete and accurate pedigrees. I have reproduced two pedigree charts of families with polydactylism. The first is that reported by Smith and Norwell (*British Medical Journal*, 1894, ii, 8); the second by Struthers (*Edinburgh New Phil. Jour.*, 1863, xxviii, 83). This is an anomaly which would hardly escape notice even though the child lived only a few days and there could be no reason for concealing the fact that such a deformity had occurred, and still the two charts show the greatest difference in demonstrating that polydactylism is an inherited unit character. Two charts of Goddard's, an original and a revised form show how easily erroneous conclusions might be based on the original data. It must be remembered that abortions, stillbirths, and deaths in early infancy, frequently occur in the family history of Mongolian imbeciles, so that it is not at all unlikely that such a case is occasionally overlooked or unrecognized. In the 300 feeble-minded investigated by Goddard, 66 per cent. are classed as hereditary or probably hereditary, while only eleven or 3.6 per cent. were Mongolian imbeciles. These relative percentages correspond well with those given by other authors, so that hereditary feeble-mindedness as classified by Goddard is about eighteen times as common as Mongolian imbecility. It is, therefore, not surprising that the pedigree charts of Mongolian imbeciles should not indicate inheritance so frequently or so distinctly. The probability of the mating of two carriers of this unit is much less than of two individuals who are carriers of simple feeble-mindedness. It must also be remembered

that one positive pedigree is more convincing and valuable than several negative ones. In one of Goddard's families and in three families which have come under my own observation there were two Mongolian imbeciles. Shuttleworth Stevens, and Hjorth (twins) have also reported such cases.

There is no positive evidence that worry, emotional shock, illness during pregnancy, or congenital syphilis are important or essential factors in the causation of Mongolian imbecility. The evidence that Mongolian imbecility is a unit character and recessive, although not conclusive, is suggestive.

#### DISCUSSION.

DR. CORA M. BALLARD.—My observations in families in which there has been Mongolian imbecility is that in every branch of those families the majority of the children had various stigmata of degeneration. I can bear out Dr. Hermann's conclusions.

A MEMBER.—There is one thing I want to emphasize and that is this: We must consider the possibility of toxemia having a relation to congenital defects; it would seem impossible from a study of the present generation to rule out toxemia as a factor in the production of Mongolian imbecility. This also has a bearing when we attempt by the Wassermann reaction to exclude syphilis. There is now a general agreement that alcoholism in the parents produces defects in the nervous system of the child. I have observed defects in the eye which are more obvious and easily noted appearing in successive generations, but suppose alcoholism in a parent results in an eye defect in the child, in the course of two or three generations it is impossible to say that the defect is the result of alcoholism, and we are in about the same place when we come to judge of the hereditary effect of toxemia.

DR. EDDY.—I do not think Dr. Hermann has proved much, because in looking through a family in other conditions one almost always finds some defect somewhere along the line. The mere association of Mongolian imbecility with those defects does not seem to me to prove anything.

DR. WILLIAM B. NOYES.—Dr. Hermann did not mention hypothyroidism and yet this condition is often marked in Mongolian imbeciles. Many instances of cures were reported when thyroid extract was first used. This has been more recently tested out in Vineland, and while the hypothyroidism may be improved the main condition of Mongolism remains unchanged. In general Mongolian imbecility is a condition where several stigmata of degeneration are in evidence in a definite and recurring combination in a low-grade imbecile. Not all are present in every case. The slanting eyes, the brachycephalic head, the fissured tongue, short pudgy or pointed fingers with the little finger abnormally short and crooked, are constant. Congenital heart disease and hypothyroidism are frequent. But sometimes two or three of these defects are present in a case distinctly not a Mongolian imbecile. The mentality may reach as

high as that of a moron in rare cases. The figures quoted by Dr. Hermann are certainly quite convincing and the association with the laws of heredity on Mendelian principles quite convincing. The syphilitic origin is worked out in the Stephen list appears plausible, but have not been confirmed in the cases seen in the mental clinic of the Department of Charities except in a few isolated cases.

DR. CHARLES HERMANN, in closing.—With regard to toxemia as a factor in the causation of Mongolian imbecility, I do not see how any toxemia could produce alternately a normal child and a Mongolian imbecile, nor can I see how it would be possible for toxemia to affect only one of twins. I cannot conceive of the two germ cells in the case of twins one of which is affected by the toxemia of the mother and the other not.

With regard to hypothyroidism and Mongolian imbecility, there was a time when these two conditions were confused, but we have come now to recognize them as two distinctly different conditions. There is no doubt that in some cases of Mongolian imbecility a slight improvement has been brought about by thyroid medication. Some years ago, Siegert reported what he then considered a case of cretinism, with a normal thyroid postmortem; after studying the case he finally took back what he had said and decided that it was a case of Mongolian imbecility. While in a few instances there may be slight improvement after the administration of thyroid such improvement is not marked or permanent.

As to the fissured tongue, that is a simple question of sucking, excessive sucking first produces a prominence of the papillæ and then fissures.

As to the last argument that there are defectives in all families, it may be said that our evidence here is cumulative and in time we may get enough to prove the position I have taken; we have here in one instance alternately a normal child and a Mongolian imbecile and there are many defects in this family among them three instances of congenital nystagmus and a case of deaf mutism.

DR. ABRAHAM JACOBI concluded his serial

#### HISTORY OF PEDIATRICS IN NEW YORK.

I may have made a mistake in promising to prepare you a history of pediatrics in New York City, I cannot help speaking of myself in connection with that task. Much of what I have been engaged in is concerned with diet and hygiene. Milk was with many of us a serious study. From the time that we had nothing but the rotten milk of the manure heaps of Long Island sixty years ago to the vastly improved secretions of to-day the milk problem has required incredible exertion. In the burning summer of 1854 at the corner of Christie and Hester Streets I left a dying baby, not the only one of my numerous victims of the murderous temperature. On the sidewalk I met Dr. Joseph Kammerer whom I asked what I was to do. He said, "You are killing your babies by feeding them on what we call milk; stop that." Dr. Henry Schwieg, the other man said:

"Stop milk and everything else for twenty-four hours, or even a day; that is the only way for a possible recovery." I learned from both; they saved many babies for me. From my early time I fought the feeding of raw milk. Recently Dr. Brennemann of Chicago in a paper on this subject has quoted me and a small number of his recent friends. From this I learn that the gospel of boiling has found followers and even prophets. In connection with the question of the wholesomeness of milk we should not overlook the work of Mr. Nathan Strauss, who in his own person has done more than you or I or all of us.

My teaching of the necessity of cereal decoctions as an addition and as a corrective of milk has won many favorable criticisms and imitations. I have often been told by those who write books that cereals are practical, really practical. I am also informed and have read paper with information that my teaching of the use of cane sugar in place of milk sugar is finding favor even in America, also that the gospel of fat feeding is no longer sustained by those who have had enough fear of acidosis and diarrhea and indican as long as the victims are only other people's babies, dead or dying, and that there are those who are satisfied with Jacobi's 2 per cent. fat mixtures, as long as the survival of the babies is the practical point of view. All these things I have taught in schools and papers and lectures long before 1870, in a pamphlet I prepared in 1872 for the Board of Health; in a small book, "Hygiene of the Child," in 1874; in a larger book on "Intestinal Diseases in 1887; in the first volume of Gerhardt's wonderful Handbook; in Buck's Hygiene, and in other productions. My treatise on Infancy and Childhood appeared in 1896, 1900 and 1903. Hard work of all sorts has prevented me from preparing new editions. That is why I stopped the sale of the book. I was of the opinion that a few of the American text-books which were really good satisfied the actual needs of the market not to speak of the needs of the more numerous authors. I am pleased to know that this is so, and that the large number of bad books could do no such harm as the good books of Holt, Rotch, Kerley and Sachs, and a few monographs as that of Brothers would be useful and beneficial. Personal ambition is not in my line; with the men who concoct books by the aid of other books I have little sympathy. They may be forgotten in 250 years like myself. It has taken a few years only before a number of journals supplied the want of magazines. In 1868 I started with Benjamin Dawson and Emil Noeggerath, the *American Journal of Obstetrics and Diseases of Women and Children*. You know it well and its many meritorious volumes of the last half century. I continued my personal editorial work a few years only.

Among the results of my experience I recall a few which are appreciated by many. From my papers on the tonsils and their dangerousness and their exaggeration, I count this which follows. There is much that is overdone. The tonsils are not always as dangerous as they are made out to be. Indeed, I believe that too many tonsils are removed in pediatric practice and malpractice; too many

are excised in place of being resected. Tonsils are not so preposterously dangerous not even when you find tubercle bacilli in the crypts. As a rule, they are not absorbed from them. But what is dangerous is the infection which takes place in and from the ring of Waldeyer. That is why the infected tonsil of itself does not give rise to the vast streptococcus swellings on one or both sides.

I have always taught to keep children's noses and throats clean. What I taught sixty years ago I am teaching now. Warm saline solution is the best cleanser; boracic acid solution, rarely bichloride, 1 : 10,000 will sometimes take its place. No atomizer and no dropper, and only for certain essential indications a syringe may take the place of a nose irrigation. A Whitall Tatum, No. 10 nasal douche, or for small children an E. Kretz Owen douche is safe. I never injure or endanger an ear so long as no snuffing up is permitted. Two daily irrigations with no snuffing up keep the nose clean and healthy. Potassium chlorate has been used and abused a great deal. Small and frequent doses are indicated. In stomatitis, catarrhal and ulcerous, or in its combinations, even streptococcus a child of three years may have from 15 to 20 grains in twenty-four hours. In diphtheria and other bacillary or septic infections the same dose may be employed with tincture ferri chloride in water, and glycerin or syrup. Such combinations have long been sold by some apothecaries as Jacobi's mixture, even to this very day. The tincture must be administered in frequent small doses and not followed by water, for the sore fauce should have the benefit of the local effect.

Many of my hygienic efforts have been failures. I removed heavy velvet curtains from the beds of babies; they were the pet arrangement of a lady trustee who knew no better way of getting rid of flies. I made a bad mistake when I advised the babies to be kept in their rooms with no clothing and open windows when not taken outside. From one pulpit I was sent word that these were Christian babies; they must be dressed.

One of the subjects of your studies has been infantile scurvy. Some of you remember that neither raw milk, nor boiled milk, nor pasteurized milk, nor carbohydrates, have ever impressed me as being the only or the prominent cause of scurvy. But what I always urged upon you is the persistence of uniformity of food. Nature's foods are not uniform; proprietary foods are made to be so.



## BRIEF OF CURRENT LITERATURE.

### DISEASES OF CHILDREN

#### Fractures about the Wrist in Childhood and Adolescence.—

A. C. Burnham (*Annals Surg.*, 1916, lxiv, 318) shows that typical Colles's fracture is very uncommon before early adult life. In childhood (that is before the tenth or twelfth year) the common type of fracture about the wrist is fracture of both radius and ulna either greenstick or complete. Separation of the lower radial epiphysis is of frequent occurrence during the early part of the second decade and should be carefully differentiated from dislocation of the wrist, which is so rare as to be a surgical curiosity. When fracture of the radius is suspected, either in childhood or adolescence, the line of fracture should be searched for at a point considerably higher than is the case when the same injury occurs later in life. In the case of fracture of the lower end of the radius in early life the frequency of the associated fracture of the ulna must be constantly borne in mind, the treatment of the condition being modified accordingly.

**Hirschsprung's Disease.**—R. Cadwallader (*Arch. Pediatrics*, 1916, xxxiii, 665) describes as a case of this condition a localized dilatation of the upper part of the sigmoid, descending colon and part of the transverse colon operated upon when the boy was nine years old. He had been constipated from birth. The dilated intestine formed a mass about the size of a football 10 inches long and was covered with dilated blood-vessels. Uneventful recovery followed resection. The condition was attributed to a congenital lack of innervation of the dilated portion of the colon.

**Parenteral Infections.**—From a study of 200 cases of parenteral infection, J. R. Gerstley (*Arch. Pediatrics*, 1916, xxxiii, 671) concludes that parenteral infections in many cases are associated with a mild or moderate diarrhea. If the child is allowed to drink as he sees fit, this diarrhea rarely develops into a severer disturbance. It almost never does in children on a mixed diet. The very few cases of severer disturbances which developed followed no rules that the writer could discover. They did not depend upon: (a) anatomical situation of the infection, as bronchitis, otitis or cystitis; (b) degree, length or severity of the infection; (c) upon constitutional inferiority of the child, or upon (d) the outcome of the disease. In many cases the initial diarrhea and vomiting which occur before admission to the hospital seem to be due to the invariable dose of castor oil, and some charts show diarrheas associated with coughs occurring in the hospital, conditions which seem also to be related to the medication in some way, as, for example, aromatic spirits of ammonia. In some cases the cough seems directly secondary to the nutritional condition and disappears as the nutrition improves.

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A MONTHLY JOURNAL.

JUNE, 1917

EDITORS

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**ORIGINAL COMMUNICATIONS.**

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**METABOLISM OF MOTHER AND OFFSPRING  
BEFORE AND AFTER PARTURITION.\***

**BY**

**JOHN R. MURLIN, Ph. D.,**

**Cornell University Medical College,**

**New York City.**

**(With eleven illustrations.)**

IN presenting to the Harvey Society the results of several years' work on various phases of the physiology of reproduction, I wish first of all to make some acknowledgments. As I proceed you will observe that the researches in which I have participated represent but a small portion of the total body of information which I shall endeavor to interpret and, in making these acknowledgments, I hope I shall not seem to magnify the importance of my own work. I experience peculiar pleasure in making use of this public opportunity to acknowledge my indebtedness to my chief, Professor Graham Lusk, whose interest and encouragement have been never-failing. My thanks are also due to Dr. F. G. Benedict for the courtesies of his laboratory in doing what was, I believe, the most important piece of work in which I have participated; to Dr. J. Clifton Edgar, head of the maternity service of the Cornell Division at Bellevue Hospital, and to Dr. L. E. Le Fetra, head of the children's service there, for the facilities of their wards; and finally to Dr. T. M. Carpenter, Dr. H. C. Bailey and Dr. B. R. Hoobler, who have been associated with me in authorship. The last-named gentlemen have borne their full share of the work and, I trust, have had their share,

\* Delivered before the Harvey Society, N. Y. Academy of Medicine, February 24, 1917.

also, of the pleasures resulting from the pursuit and acquisition of scientific data.

Because of the limitations of time imposed upon me, I shall be obliged to limit my remarks to three phases or chapters of the general subject: (1) the nutritive relations of mother and fetus; (2) the substance metabolism of the mother as modified by the presence of the fetus; and (3) the energy metabolism of mother and child both before and after parturition.

#### A. NUTRITIVE RELATIONS OF MOTHER AND FETUS.

Any adequate comprehension of the metabolic relationship between the mammalian mother and her offspring presupposes a broad view of the whole subject of reproduction. As in so many other departments of the physiology of man, interpretation of vital activities is constantly aided by reference to corresponding phenomena in lower organisms. I suppose we shall never understand fully what metabolism, nutrition, respiration, reproduction are—what they are in essence—as applied to our own tissues and bodies, until we understand their significance for the lower orders of life. We must have the viewpoint of the general physiologist and oftentimes of the naturalist.

Now the viewpoint of the naturalist regarding reproduction, since Weissmann's great work(1), has been this: The germ cells or reproductive elements are not, strictly speaking, produced by the adult body; the adult body is produced and reproduced by the germ cells as a medium in which the specific stock can be perpetuated. Seen from this angle, for those forms in which the individual counts for little, reproduction becomes the whole end and aim of life. As Hatschek(2) frames the idea, "Fortpflanzung ist das Endziel der Lebensthätigkeit." Continuing the thought, Hatschek says, "All the cells of the body stand at the service of the germ cells because in them is perpetuated their own being."

The student of reproduction in man only may easily lose sight of these broad, fundamental principles. It was for this reason, I think, that until a few years ago the mammalian ovum was regarded as nothing more than a maternal cell, just as much at the mercy of the maternal circulation as any other cell of the body; and the complicated provisions made after fertilization for insuring its supply of maternal blood were looked upon as beneficent, not to say providential, adaptations for the special care of the offspring. Partly through the cytological observations of Boveri(3), Häcker (4), Hegner(5), and many others, who have demonstrated the independence of the



*Keimbahn*, or germinal path, from one generation to the next in various lower forms of life (worms, crustacea, etc.), and partly through the embryological studies of Hubrecht(6), von Spee(7), Peters(8), Hitschmann and Lindenthal(9), Bryce and Teacher(10), Herzog(11), and Johnstone(12), who have directed attention to the details of the process of implantation of the ovum in the wall of the uterus, it has gradually dawned upon us that the ovum never is a true body cell but is, to a large degree, an independent organism, capable even in the face of difficulties of looking out for its own nourishment at every step of its development. In fact, the only possible interpretation of events within the ovary previous to the liberation of the ovum is that in each follicle a certain cell is selected to grow and thrive at the expense of its fellows because (according to Miss Lane-Claypon(13), quite fortuitously; according to John Beard(14), by prearrangement) that particular cell possesses the complement of enzymes which enable it to appropriate the materials supplied by its less fortunate neighbors to its own purposes.

It is necessary to get this point of view—that events are from the start under control of the new organism rather than the old. Upon fertilization the processes of assimilation in the ovum receive a fresh impetus, the proteolytic and proteosynthetic changes receive from the sperm cell an activating effect, something like the effect of a kinase upon a proenzyme, and the result is further growth at the expense of whatever materials the ovum comes in contact with. The follicle cells, which cling to the ovum when it is set free, and which, according to one view, prevent the ovum from becoming attached to the wall of the Fallopian tube, are digested away and, in some mammals at least, the tube supplies a nutritive secretion which is in all essential respects the analogue of the white of the hen's egg. Arriving at the uterus, the only reason why a fertilized ovum rather than an unfertilized one becomes attached to the wall, is that its cells (for there are many by this time) are hungry and they possess the means of satisfying their hunger.

From the histological studies made on an age series of hedgehog embryos by Hubrecht(6) and studies of the earliest human embryos by Bryce and Teacher(10), Herzog(11), and recently by Johnstone(12), it is evident that the process of implantation from the standpoint of the embryo is simply a continuation of the proteolysis by which it lays claim to its nutriment. The ectodermal cells which mediate this function are known collectively after Hubrecht as the *trophoblast*, or a more exact term etymologically suggested by Minot, the *trophoderm*. Although an enzyme has not been demonstrated

chemically in these earliest stages, it has been found by Gräfenburg as early as the second month in the human embryo and there can be no doubt, from the histological appearances of the earliest stages, that a very active one is at work or that it is produced by these trophodermic cells. Whatever they touch, according to von Spee, undergoes solution. Hence, wherever the ovum happens to come in contact with the uterine mucosa after the fringe of follicle cells has been digested and absorbed, it there adheres and soon dissolves a depression; the depression becomes a cavity and the cavity extends as the trophodermic cells increase in number. From the standpoint of the maternal organism, placentation, according to the interpretation first given by Sir William Turner and confirmed by most recent students<sup>(15)</sup> of the problem, represents a reaction designed to protect against the invader or, in modern phrase, to restrict the action of its enzymes. The large, specialized decidual cells are almost certainly active in the chemical defences of the maternal tissue.

By the time a circulation is needed to distribute the products of proteolysis to all the embryonic cells, a circulation is necessary also to connect the embryo with its advance lines of attack and we have the first steps in the formation of the true placenta. Stages described by Hitschmann and Lindenthal and by Johnstone, somewhat older than the Bryce and Teacher ovum, show clearly how the trophoderm of the primary villi become transformed into the double layer (syncytium and Langhans layer) of the definitive villi and how the trophoderm is responsible for the erosion and rupture of the maternal veins, thus establishing the intervillous circulation. "It is only this trophoblast," say Hitschmann and Lindenthal, "which is able to open up the vessels. The double-layered villi no longer have this power; they serve mainly to extend the absorption surfaces." Hitschmann, in a later article, states that by the end of the third month in human development "the villi have no further power of invasion of the blood-vessels."

I must pause here to point out that menstruation is caused by an enzyme of very similar nature produced by the ovary just before the ovum is set free and acting upon these same blood-vessels (Young, 16).

When the placenta is finished we have the following relationships: Maternal blood is separated from fetal blood by the two-layered trophoderm and by certain mesoblastic structures, making an arrangement practically identical with that of the wall of the intestinal villus. The question now arises, has in fact often arisen since the

time of Harvey, whether the placenta acts, as Harvey expressed it, "by a sort of digestion," or in a purely mechanical manner. Time will not permit a full discussion of this question but I will cite some of the latest evidence and the considerations which must be taken into account in making a decision whether the fetus for a time surrenders control of its nutrition to the mother.

Truly diffusible substances, like glucose and urea, readily pass the placenta. Cohnstein and Zuntz(17) in 1884 showed that a hyperglycemia produced in the mother was followed by an increase in the sugar of the fetal blood. This has been placed on surer ground by recent methods in the work of Morriss(18) of New Haven reported a few weeks ago in this Academy. Dr. Morriss finds that the sugar in the fetal blood at the moment of birth is higher when the percentage in the maternal blood has been raised either by prolonged labor or by the use of anesthetics in delivery. Also after easy labor unaccompanied by the use of anesthesia, the percentages on the two sides of the placenta are the same. It is probable, therefore, that glucose passes as readily through the placental barrier as it passes the intestinal wall. (We shall see later that these facts have their significance for the metabolism of the new-born.) Studies on the glycogen of the placenta indicate, however, that there is some regulation of the amount of carbohydrate which is permitted to enter the fetal circulation. Both Chipman(19) and Lochhead and Cramer(20) have shown that up to the eighteenth day of gestation in the rabbit (the entire period being twenty-eight days) glycogen is not found to any extent at all in the embryonic tissues, not even in the liver, but is found in abundance in the maternal side of the placenta. Goldmann(21) has shown the same to be true of the mouse but Driessen finds it not so strictly true of the human(22). Contrary to the earlier teachings of Cl. Bernard and Pflüger, it appears that embryonic cells cannot store glycogen(23) until they have reached a certain age. Glucose, arriving at the maternal placenta faster than it can be utilized by the fetus, is stored on the maternal side as glycogen until the last one-quarter of gestation when the fetal liver begins to assume its carbohydrate function, whereupon glycogen disappears gradually from the maternal placenta. Now it is scarcely open to doubt that the decidual cells perform this glycogenic function in obedience to some influence exerted upon them by the fetus itself, for otherwise glycogen is not found in this situation.

Whether fat can be drawn from the mother's blood by the fetus raises some very interesting questions. Esterases(24) have been



found in the placenta but no true fat cleavage has ever been proved to take place there. Ahlfeld(25), Thiemich(26), and Oshima(27), all have failed to influence experimentally the percentage of fat in the fetal blood by feeding fat to the mother while S. H. and S. P. Gage(28), likewise Mendel and Daniels(29), failed to find stained fat in the embryo after feeding pregnant mothers with such materials. Dr. Slemons, in a personal communication, informs me that he has been studying the lipoids in maternal and fetal bloods for a year and has reached the conclusion that neither neutral fat nor cholesterol esters pass the placenta at all but that cholesterol does. Now cholesterol is a colloid in the blood and proof that it traverses the placental barrier is tantamount to proof that a selective activity is going on(30). Bailey and I(31) have found that, while the percentage of total fat in the fetal blood is much lower than that of the maternal, there seems nevertheless to be some relation between the two and we are not sure but that there may prove to be some relation again to the severity of labor. This would not be surprising, in view of the fact that muscular work raises the fat in the blood, just as it does the sugar.

TABLE I.—TOTAL FAT IN FETAL AND MATERNAL BLOODS AT MOMENT OF BIRTH. (MURLIN AND BAILEY).

Case	Arm vein, per cent.	Umbilical vein, per cent.
1	0.60	0.22
2	0.87	0.49
3	0.72	0.48
4	0.44	0.26
5	....	0.24
6	0.54	0.24
7	0.49	0.18
8	0.40	0.21
9	0.36	0.14

There is scarcely any question about the presence of fat in the walls of the chorionic villi. This has been figured as stained by osmic acid and other reagents by many observers, especially Hofbauer(32) and Goldmann. Hofbauer's figure shows fat in the deep layers of the syncytium, in Langhan's layer and in the parenchyma of the villus, and since this is much the same histological picture as one gets in the absorption of fat by intestinal villi, where it is certain that fat is first split into its components and then resynthesized in the epithelial cells, Hofbauer interprets the picture as indicat-

ing the same chemical processes for the chorionic villi. The presence of fat in the villi, however, is not proof that it came through from the maternal blood. It may have been formed from carbohydrate or protein just where it is found. The fact that fat is found in abundance in the fetus at birth is amenable to the same interpretation; namely, that the fetal tissues have the capacity to form fat out of carbohydrate or protein. We have as yet, I should say, no positive proof that fat either is or is not taken up by the placenta. We can say with certainty only that it does not pass readily through the villi if it passes at all and it is never present in the same concentration in the fetal blood as in maternal. But this is not inconsistent with the vitalistic theory.

How proteins pass the placenta is the most important question of all. Gräfenburg(33) was not able to find evidence of proteolytic enzymes in the human placenta after the fourth month. Nevertheless, products of proteolysis, especially albumoses, have been found by Mathes(34), Basso(35), Hofbauer and others, both in fresh placenta and in minced placenta, after undergoing autolysis for a short time, at all stages of gestation. Hofbauer, although a firm believer in the vitalistic theory, was obliged to conclude that digestion stopped at the albumose stage and that synthesis takes place immediately the trophodermic cells are passed. That amino-acids can readily find their way through the placenta has now been definitely proved and Dr. Morse(36) in Slemmons's laboratory has been studying the monamino-acid content of maternal and fetal bloods taken simultaneously at the moment of birth. He finds a constant difference which, however, he thinks indicates diffusion from mother to fetus. Mr. Bock, in Dr. Benedict's laboratory at Cornell, at my request has made a number of examinations of the two bloods taken in the same manner and has found the percentage in fetal blood very distinctly higher than that of the maternal blood. Should it develop that the amino-acid content of the fetal blood is constantly, even though slightly, higher than the maternal, the conclusion would inevitably be (1) that these bodies are on their way out from fetus to mother or (2) are being produced in the placenta for use in the fetus or (3) again, that a selective activity is at work. Either of the last two interpretations would favor the idea that protein, the indispensable building material, continues to be modified by the placenta.

The transport of iron from mother to fetus cannot be accounted for on mechanistic grounds. The mammalian ovum being practically devoid of yolk, contains no iron for the manufacture of

TABLE II.—MONAMINO-ACID-NITROGEN IN FETAL AND MATERNAL BLOODS AT MOMENT OF BIRTH (BOCK).

Case	Arm vein	Umbilical vein
1	6.6 mgm. per 100 c.c.	12.15 mgm. per 100 c.c.
2	8.9 mgm. per 100 c.c.	14.92 mgm. per 100 c.c.
3	8.93 mgm. per 100 c.c.	11.80 mgm. per 100 c.c.
4	7.44 mgm. per 100 c.c.	9.57 mgm. per 100 c.c.

respiratory pigment. There are two possible sources of this: The hemoglobin of the maternal blood, and certain conjugated proteins of the food. Concerning the transformations of the latter as a source of iron for the fetus we know next to nothing. Many observations on the disintegration of red blood corpuscles by the trophodermic cells, however, make it certain that the main reliance of the fetus for this essential element is the maternal blood. Hemolysis produced by placental extract, reported by Veit and Scholten(37); the eosin reaction of hemoglobin at the free border of the syncytium, seen by Bonnet; and the demonstration of loose organic compounds of iron in the deeper layers of the villi, by Chipman, Hofbauer(38) and Goldmann; may be regarded as pointing the way to a solution of this matter. In those animals which produce a "uterine milk" phagocytosis(39) on the part of the trophodermic cells probably accounts for the transfer of iron.

One is obliged to conclude from the weight of evidence at present that there is much more to be said for the vitalistic conception of the placental function than for the mechanistic. The very existence of the placental barrier, the fact that the two bloods cannot intermingle would seem to imply the necessity of a process of naturalization at the border line of all materials which are used in the construction of the fetal tissues. Materials used only as a source of energy need not be so modified.

Under the mysterious guidance of the mechanism of heredity the proteins are built up into a new being which reproduces the essential characteristics of the phylum class, order, genus and species to which the germ cells, belong. Heape's (40) famous experiment in which the fertilized ova of one variety of rabbit were transferred to the uterus of a different variety and were born without showing any effect of the foster mother, and experiments by Castle(41) in which the same independence of the germ cells was demonstrated by transplantation of the ovaries of a black guinea-pig into a white female, leave no doubt upon this point—a human child is born human

not so much because it is nourished by a human being as because the germ cells from which it came are human. Nobody knows yet how closely related germ cells and fostering mother must be in order that development may proceed. At all events, it is clear that the same necessity for enzymes to harmonize the building materials of the fetus to its own type exists at every stage of development before birth, as after. The early enzymes with which the embryo starts out are just as much a part of the mechanism of heredity as are the enzymes of germinating seed. Indeed, one is tempted to assert that the mechanism of heredity is itself mainly an orderly succession of enzymes. Loeb(42), Robertson(43), Loeb and Chamberlain(44), Riddle(45), Goldschmidt(46), and others have adduced evidence that the determiners of heredity behave like enzymes and Reichert(47), from his study of homologous proteins and starches in different species and genera of animals and plants, has formulated a conception of the germ-plasm as "a complex physicochemic system of which an enzyme that starts the serial changes" and others that keep them going progressively are integral parts. A very significant observation by Abderhalden(48), made just before the beginning of the war, has a direct bearing upon this question. Attempting to prove the synthetic action of ferments in the construction of proteins, Abderhalden made hundreds of different combinations of amino-acids and tissue extracts, but with no marked success until he tried the following: Digesting the several kinds of tissue, kidney, liver, thyroid gland, lung, etc., with pepsin, trypsin and erepsin until the digests were biuret-free, he added to the mixtures of amino-acids thus obtained a maceration juice extracted from the same tissues. Under aseptic precautions these mixtures were allowed to stand for five months at room temperature. At the end of this time there was clear evidence of synthesis but *only in those tubes which contained amino-acid mixture and extract (enzyme) from the same organ.* Kidney amino-acids were built up by kidney enzyme but not by thyroid; thyroid amino-acids by thyroid enzyme but not by kidney enzyme, etc. If this observation is confirmed we shall be obliged to infer that the repair in adult life and the development in embryonic life of each tissue protein is under the control of a specific enzyme, acting upon a specific substrate. It will be in order, then, to attempt to trace the different enzymes back step by step to the germ cells with the hope there to identify them with the chromosomes which are known on morphological grounds to contain the determiners of heredity. A substrate common to all tissues after the earliest stages could be

found only in the blood proteins. Seen with the eyes of the general physiologist, the nutritive relations of mother and fetus, then, find their explanation in the specificity of the proteins and the specificity of enzymes which lie at the basis of heredity—the reproduction of kind.

#### B. SUBSTANCE METABOLISM OF PREGNANCY.

Stated in terms of the different combinations of protein building stones, or "stereoisomers," necessary to set up a new human organism, complete in all anatomical details, the requirements for fetal growth are enormous. Can the mother supply all of the building materials from her food, or must she perforce supply some structural elements, chemically speaking, from her own body? In some lower orders of animals the young, before being hatched or setting out upon an independent existence, consume the maternal body, the individual thus being sacrificed for the good of the species. Is gestation in the mammals in this sense to any degree "a sacrifice of the individual for the good of the species"?

Stated in quantitative terms, the substance requirements of the fetus are not large. According to Sommerfeld(49), a normal infant at birth weighing 4340 grams contained just short of 100 grams of nitrogen, not more than would be contained in its mother's diet for ten days at most. Michel(50) has shown also the composition of the fetus at different stages of development for nitrogen, phosphorus, calcium and magnesium. It is noteworthy, according to these results, that up to the end of the seventh lunar month not more than one-fourth of prenatal growth in terms of protein and salts has taken place.\*

TABLE III.—COMPOSITION OF THE FETUS (MICHEL).

Age, weeks	N, grams	P, grams	Ca, grams	Mg, grams
16	2.941	0.662	0.419	0.021
20	6.054	1.448	2.214	0.077
24	11.048	2.444	4.082	0.133
28	16.005	3.527	5.881	0.190
40	72.700	18.673	33.260	0.815

Suppose it were possible from the moment of conception to keep a balance sheet of these substances for the mother, setting her intake

\* It would have been somewhat more convincing if Michel had used measurements instead of ages.

as food over against the output through her excretory channels. We should then be able to say whether a sufficient quantity of each substance had been retained to cover the requirements or whether the pregnancy resulted in a net loss.

Experiments of this character, with reference to nitrogen, carried out on animals by Reprew(51), Ver Ecke(52), Hagemann(53), Jägerroos(54), Bar and Daunay(55), Murlin(56), and Gammeltoft, (57), have developed the following facts:

1. Upon an adequate diet a dog, for example may retain more than sufficient nitrogen to counterbalance the loss at parturition, plus the quota taken up by the uterus and mammary glands.

2. Upon a diet which is only sufficient to maintain nitrogen equilibrium in the nonpregnant condition, due allowance being made for difference in weight, the pregnancy will result in a net loss. The katabolic effect of the presence of the fetus is greater than the anabolic effect, taking the pregnancy as a whole.

3. While in the latter half of pregnancy there is always a plus balance, in nearly every instance recorded in animals (including the dog, rabbit, rat and goat), whatever the diet, there is in the first half either an actual negative balance or a strong tendency thereto.

The latter point may detain us for a moment. Here apparently is something quite unusual. One might reasonably expect that the moment conception occurs, retention of materials for the growth of its product would begin and, since the total quantity needed for development to the middle of pregnancy could be taken by the mother in a single meal, the retention of this amount spread over so long a time should be an easy matter. Katabolism, however, has the upper hand and Gammeltoft has shown that it is not possible to overcome the tendency by heavier feeding. Indeed, Jägerroos, Bar and I have each noted that the dog at about the third and fourth week of pregnancy, corresponding to the third and fourth calendar months in human pregnancy, may show lack of appetite and may even vomit. Bar calls especial attention to the correspondence of this period of negative balance to the period of morning sickness or the so-called *physiological vomiting* in women. It is true that a period of negative balance has not been seen in the woman. However, it is very significant that in the only two cases in which a nitrogen balance has been kept as early as the third month (one by Landsburg(58) and one by Wilson(59)) the plus balance should be distinctly less in this month than in the second or fourth although there were no gastrointestinal symptoms. The only reason then must have been increased katabolism.

What is the explanation of this greater katabolism? It can be found, I believe, only in the nature of the means employed by the fetus for its nutrition at this stage. Recall the activity of the trophoderm up to the end of the third month in the human, and the

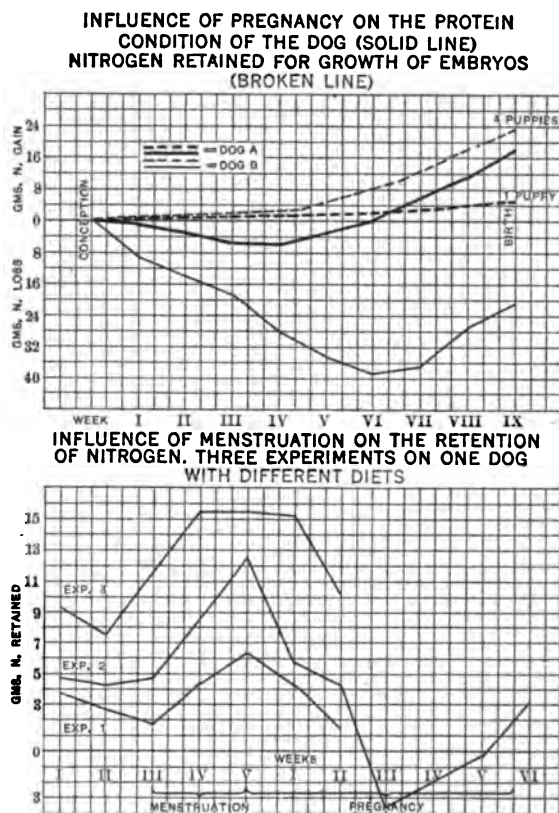


FIG. 1.—The lower curves show the course of the total nitrogen retention during the menstruation and early pregnancy of the dog. Note the minus nitrogen balance in the third and fourth weeks of pregnancy. Upper curves show the total nitrogen gain or loss at each week of the pregnancy in two different dogs. Dog B finished with a minus balance (some 20 grams behind) in a gestation with four pups. Dog A finished with about the same amount ahead in a gestation with one pup.

fact that a proteolytic enzyme is demonstrable up to the end of the fourth month, a time when the placenta is considered to be completed in all essential structures. The time at which the negative balance gives way to a positive balance in the majority of the dogs studied

corresponds well with the time at which, according to Bonnet(60), the placenta in this animal is completed (thirtieth day). During the period of negative balance or tendency thereto, when the mother is losing more nitrogen from her body, the trophodermic cells on behalf of the fetus are producing the enzymes which enable the villi to invade the maternal tissues and become securely implanted in the decidua. When this invasion process has come to an end, nitrogen retention is easier. The facts clearly suggest that the extraordinary excretion of nitrogenous bodies is an inevitable wastage incident to

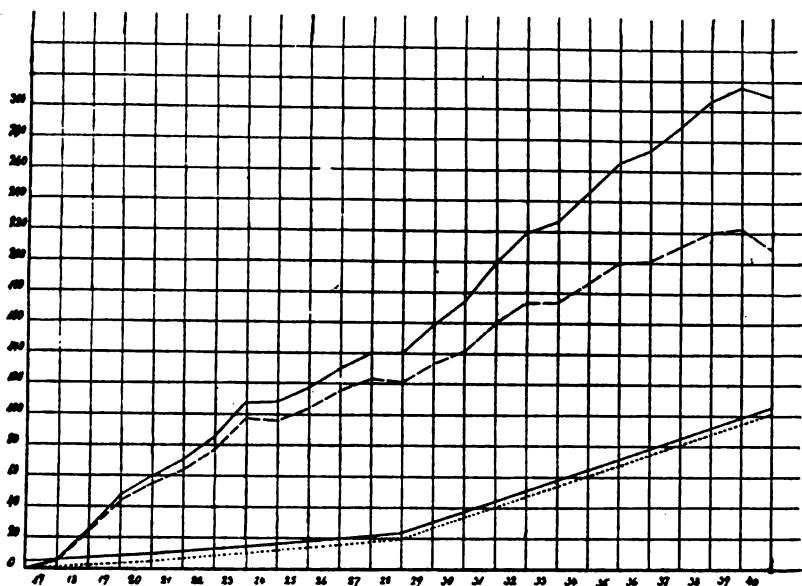


FIG. 2.—Chart showing retention of nitrogen by Hoffström's case from the seventeenth to the fortieth week of pregnancy. — Total N retained; - - - - N retained by fetus (based on Michel's analysis, Table III); — — — N retained by mother's own body.

indiscriminate action of enzymes and is closely comparable at this stage with the wastage incident to cancer. The proteolytic action of the trophoderm is more or less unrestricted; its enzymes are not yet confined to a definite locality; they may even be distributed throughout the mother's body.

This hypothesis, which was offered seven years ago(56) as an explanation of the negative balance in dogs and of the period of physiological vomiting in women, has been reviewed very favorably by Gammeltoft, but he criticizes it as laying upon the mother the



blame for a state of affairs which proves to be toxic for herself. Gammeltoft thus has overlooked the overwhelming evidence that the fetus, the neoplasm if one will, is producing the enzymes for its own use regardless of its effect on the mother. If the mother makes a prompt reaction, limiting the invader by means of the placenta, and possibly counteracting the enzymes with an antiferment produced by the specialized decidual cells, the period of heightened katabolism may be of short duration and of no serious consequence. Products of proteolysis may well be the cause of vomiting. Failure of the maternal reaction for defense and continued intoxication with such prod-

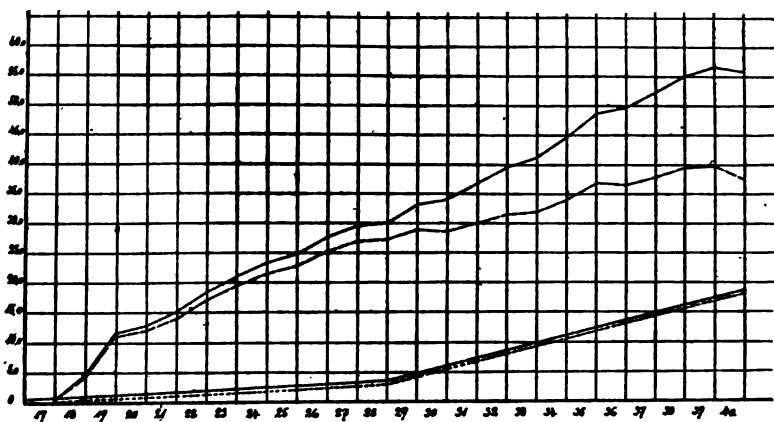


FIG. 3.—Chart showing retention of phosphorus by Hofström's case from the seventeenth to the fortieth week of pregnancy. — Total P retained; - - - - - P retained by the fetus (based on Michel's analysis, Table III); — — — P retained by mother's own body.

ucts are, not improbably, the cause of hyperemesis, or pernicious vomiting. Young's(61) explanation of eclampsia as due to infarction of the placenta with consequent autolysis and intoxication of the mother with toxins of protein nature, is readily accommodated to this view and would account for the high undetermined nitrogen of the urine of that disease first noted by Ewing and Wolf(62) and confirmed recently by Losee and Van Slyke(63). The rapid autolysis which Young demonstrates in such placenta could be explained only by very active enzymes already present. The toxemias of pregnancy, then, it is suggested, may be explained as perversions of the chemism underlying the nutritive relations of mother and fetus.

When the net result of normal pregnancy is counted up for the woman, as has been done from the seventeenth week to the end of

gestation for one case by Hoffström(64), and from the nineteenth and twenty-fourth weeks, respectively, to the end for two others by Wilson, we find that the total retention of nitrogen exceeds the requirement of the fetus, uterus, placenta, membranes and mammaries by a very handsome amount.\*

This accords with the experience of a large percentage of mothers who find themselves physically much better off at the end of gestation than at the beginning. Such advantage to the mother is, no doubt, a purposive one, as both Hoffström and Wilson suggest, in anticipation of the demands of labor and the lactation period. The

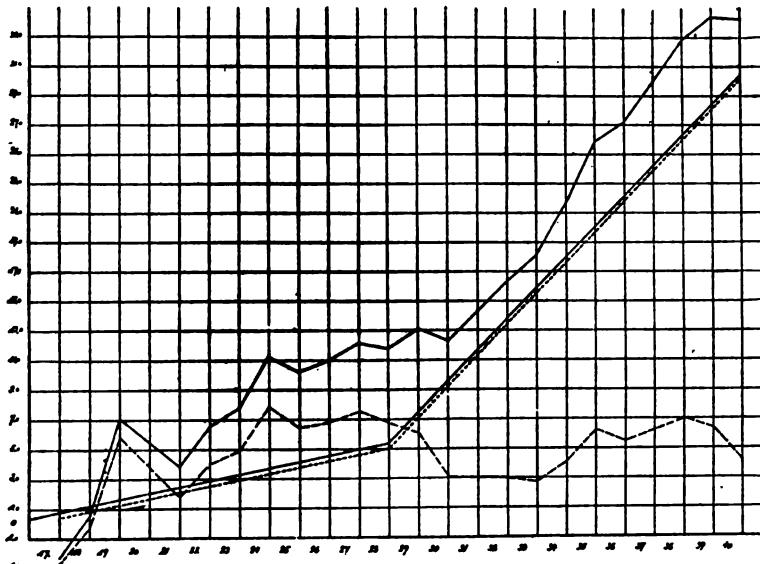


FIG. 4.—Chart showing retention of calcium by Hoffström's case from the seventeenth to the fortieth week of pregnancy. ——— Total calcium retained; - - - - - calcium retained by the fetus (based on Michel's analysis, Table III); — · — · — calcium retained by mother's own body.

pelvic and abdominal muscles appear to claim a large share of the surplus, but the gain is also more or less general. I have calculated the quantity of milk at 1.5 per cent. of protein which might be produced from the nitrogen gained during the pregnancy for the three cases mentioned:

	Grams retained	Equivalent in milk
Hoffström's case.....	209.0	87 liters
Wilson's case II.....	284.5	114 liters
Wilson's case III.....	210.9	88 liters

\* The human female enjoys a great advantage over the female of many other species in the fact that her offspring rarely weighs over 8 per cent. of her own body weight, whereas the dog, rabbit and many others deliver as much as 20 to 25 per cent. of the body weight.

It is no discredit to the maternal organism to say that this apparent benefit to her body was brought about through the stimulus of the fetus itself. This has been proved for the mammary glands by Herrmann(65), the hormones coming from the placenta, and it seems reasonable to hope that we shall some day find a stimulus to growth and development for underdeveloped women by employment of such extracts made from lying-in material.

The story for nitrogen retention may be repeated with some variations for other chemical elements, phosphorus, sulphur, calcium, magnesium. Höffstrom's curves show a substantial gain for each element except calcium. This should be borne in mind in relation to a possible acidosis to be mentioned later.

Höffstrom's beautiful work, which required two years for its completion after the materials were collected, together with Wilson's work, may be truly said to demonstrate that, so far from being a sacrifice of the individual for the good of the species, gestation normally may be looked upon as a means employed by the species for the good of the individual (mother).\*

Further evidence of physiological adaptation may be found in a study of the *qualitative effects of pregnancy on protein metabolism*. Pregnancy is one of the few conditions studied (fasting is another) in which the distribution of nitrogenous and sulphur compounds in the urine shows any departure from the usual distribution in normal adults on ordinary mixed diets. All of these changes, however, can be explained on physiological grounds. The following changes in the absolute sense have been demonstrated, all referring to late pregnancy:

1. Urea nitrogen is distinctly lower (Massin(66), Whitney and Clapp(67), Mathews(68), Edgar(69), Murlin(70), Murlin and Bailey(71)).
2. Ammonia nitrogen is very slightly, if any, higher (Slemons(72), Falk and Hessky(73), Murlin(74), Murlin and Bailey(71), Gammeltoft(57), Hasselbalch and Gammeltoft(75), Losee and Van Slyke(63), Wilson(59)).
3. (a) Creatinin nitrogen may rise just before parturition (Murlin for dog and woman; not observed three to six weeks antepartum by Van Hoogenhuyse and ten Doeschate(76) or Murlin and Bailey); (b) Creatinin may fall just before parturition (Gammeltoft for rabbit).

\* It would be interesting and important to know whether at the end of lactation any part of this acquisition on the part of the mother has been retained.

4. Creatin appears in urine even on creatin-free diet shortly before parturition (Heynemann(77), Murlin(70), Krause(78), Van Hoogenhuyse and ten Doeschate, Murlin and Bailey, Gammeltoft.

5. Amino-acid nitrogen, as determined by the Van Slyke method, not increased (Lossee and Van Slyke); as determined by Henriques

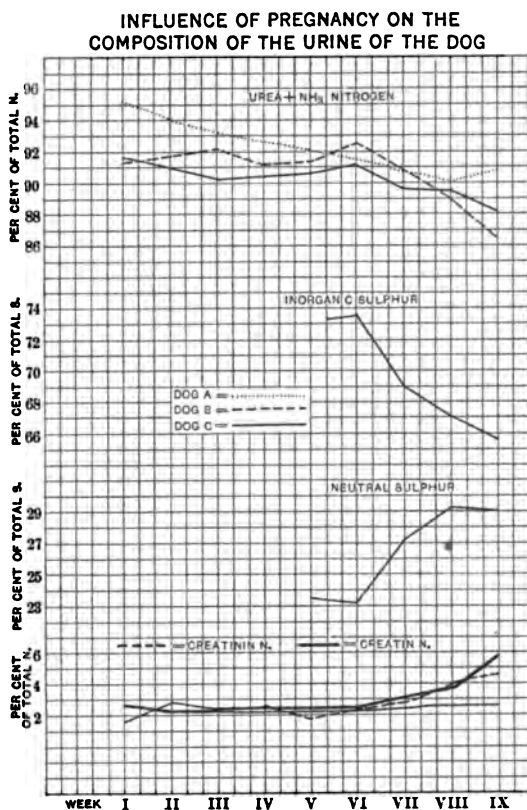


FIG. 5.—Chart showing influence of pregnancy on the *percentage* of urea and ammonia nitrogen creatin and creatinin nitrogen and the inorganic and neutral sulphur fractions in the urine of the dog. Compare Charts 6 and 7. The changes are due to retention of nitrogen which would be excreted as urea in the non-pregnant condition and of sulphur which would be excreted as inorganic or oxidized sulphur.

and Sørensen titration method, slightly increased (Falk and Hessky, Murlin and Bailey, Gammeltoft, Wilson).

6. Total purin nitrogen somewhat increased (Murlin and Bailey).

7. Undetermined nitrogen, including polypeptid nitrogen, slightly

increased (Ewing and Wolf, Murlin, Murlin and Bailey, Falk and Hessky, Lossee and Van Slyke).

8. Inorganic sulphate sulphur, distinctly lower, and neutral sulphur only relatively higher (Murlin for dog and woman; Hoffström for woman).

The explanation of the lower urea nitrogen and inorganic sulphate sulphur is found in the retention of materials which, in the absence of the fetus, would be excreted in these forms. The relatively higher creatinin and unoxidized or neutral sulphur, products considered as strictly endogenous, is explained by the lower percentage of the exogenous urea and inorganic sulphate sulphur. The presence of creatin is probably due either to the slight acidosis to be mentioned

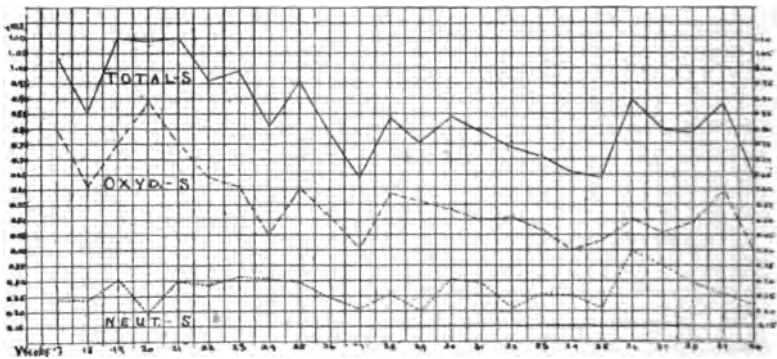


FIG. 6.—Chart showing the distribution of the sulphur fractions in the urine of Hoffström's case from the seventeenth to the fortieth week of pregnancy. The neutral sulphur remains at about the same level (in the absolute sense) throughout. The inorganic sulphate sulphur falls, showing that the sulphur, which in the nonpregnant condition would be oxidized, is held back by the fetus.

presently or to the demands of the fetus late in pregnancy for carbohydrate, or both. The slightly higher amino-acid and polypeptid nitrogen and undetermined nitrogen may not be strictly reciprocal with the-urea nitrogen, for they are lowered in the absolute sense immediately after parturition. Slight increase of these substances does not signify deficient deamination by the liver, for if the liver were injured, one could scarcely imagine that it would recover immediately after parturition. The sudden drop much more cogently suggests a fetal origin for such bodies. In so far as protein materials must be worked over by the placenta to harmonize them to the purposes of the fetus, there must be rejected materials and these added to the general circulation would in part pass to the kidney

before being deaminated, whereas such bodies originating in the alimentary tract have first to pass the liver.

The ammonia nitrogen deserves more than passing mention. Ten years ago this fraction of the nitrogen in the urine suddenly assumed large proportions in obstetrical literature because of its supposed value as an index of hepatic inefficiency. This estimate has not been maintained because, on the one hand, known pathological lesions of the liver have not been shown to produce high ammonia and, on the other, because the researches of Underhill and Rand(79), Heynemann, Murlin and Bailey, and Losee and Van Slyke, have made it very doubtful whether the high ammonia of

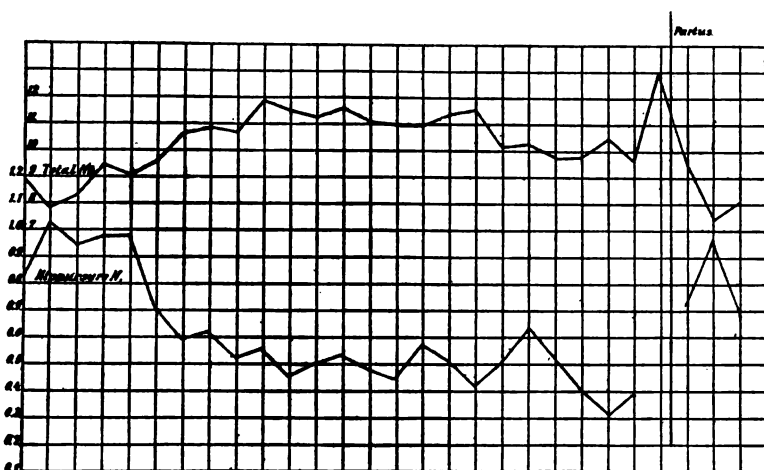


FIG. 7.—Chart showing the relation of the hippuric acid nitrogen to the total nitrogen in the urine of a goat during pregnancy (Gammehoft). The hippuric acid in herbivorous urine corresponds to the urea nitrogen in the urine of other animals. This chart should be compared with Chart 5 showing the behavior of urea and ammonia nitrogen in the dog.

pernicious vomiting is ever to be ascribed to anything more than starvation and depletion by the fetus; further that eclampsia may be accompanied by no increase in ammonia; and finally that large errors may easily arise from faulty methods of collection and preservation of the urines. The significance of ammonia in the urine is, therefore, restored to its old status; namely, an index of the depletion of fixed bases. Is there such a depletion in normal pregnancy, either by overproduction of acids and excretion of bases in combination with them, or by withdrawal of bases to the fetus? The position of Murlin and of Heynemann that there is in normal

pregnancy no absolute increase, but only a relative one due to lower urea nitrogen, has been substantiated by the most recent investigations of Hasselbalch and Gammeltoft at Copenhagen, by Wilson at Johns Hopkins, and by Losee and Van Slyke here in New York. The effect of the nitrogen retention upon the ammonia percentage is well illustrated by the following figures from Landsburg. The diet was similar in all cases.

TABLE IV.—AMMONIA NITROGEN IN URINE OF PREGNANT AND NONPREGNANT WOMEN (LANDSBERG).

	Total N	NH <sub>3</sub> - N	Per cent. of total
Average 10 cases, pregnant.....	12.68	0.786	6.2
Average 6 cases, nonpregnant.....	16.03	0.771	4.8

TABLE V.—EFFECT OF CATHARSIS (MURLIN AND BAILEY).

	Total N	NH <sub>3</sub> - N	Per cent. of total	CR - N
Normal pregnancy, ninth month	5.82	0.57	9.8	0.21
After severe catharsis.....	3.36	0.58	17.3	0.23

Also the effect of a severe catharsis is illustrated in one of the cases reported by Murlin and Bailey. In both instances the total ammonia excretion in grams is the same and the higher percentage is due to lower total nitrogen, caused, on the one hand, by retention and, on the other, by a too severe purging which removed the food as well as the waste from the bowel.

TABLE VI.—ACIDOSIS OF NORMAL PREGNANCY AVERAGE OF ELEVEN CASES (HASSELBALCH AND GAMMELTOFT).

	Antepartum	Postpartum
<i>Urine</i>		
Total nitrogen (grams).....	9.2	11.4
NH <sub>3</sub> - N (grams).....	0.55	0.57
Per cent. of total.....	5.9	4.9
<i>Blood</i>		
P <sub>H</sub> at 30 mm. tension.....	7.44	7.49
Corrected for actual tension.....	7.44	7.44
<i>Alveolar air</i>		
CO <sub>2</sub> tension (mm. Hg.).....	31.3	39.5

The absence of high ammonia in the absolute sense does not,

however, preclude the presence of a slight acidosis. The body has other resources than the formation of ammonia for the neutralization of acid. A slight excess of organic acid in the circulation could be compensated by removal of a little more carbonic acid from the blood, while a slight relative acidosis due to diversion of bases to the fetus would produce the same net effect indirectly by diminishing the carbon dioxid-carrying power of the blood. As a matter of fact, Leimdorfer, Novak and Porges(80) and Hasselbalch and Gammeltoft find a lower alveolar tension of carbon dioxid in pregnant

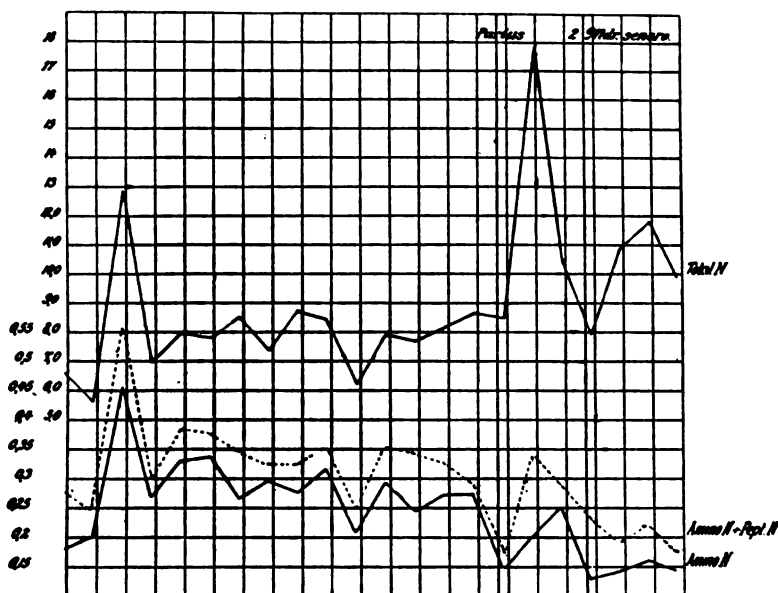


FIG. 8.—Chart showing relation of mon-amino-acid nitrogen and of total peptid-bound nitrogen to total nitrogen in the urine for last two months of a normal pregnancy (Gammeltoft). Note the fall in amino-bodies immediately after parturition simultaneously with the great rise in total nitrogen.

women and state that it appears as early as the first estral cycle following conception. Losee and Van Slyke confirm this 'for late pregnancy by Van Slyke's method for the carbon dioxid-combining power. The delicate regulation of the actual hydrogen-ion concentration without drawing upon the ammonia mechanism is beautifully illustrated in Hasselbalch and Gammeltoft's work. They report simultaneous determinations upon urine, blood and alveolar air, both before and after parturition, for eleven cases of normal pregnancy.



The ammonia before parturition is not higher than after but there is at any given tension of carbon dioxide a higher concentration of hydrogen (lower  $P_H$ ). Corrected for the observed carbon dioxide-tension in the blood drawn, the concentration of hydrogen is exactly equalized. The slight decrease in carbon dioxide-carrying power of the blood (for any given tension of that gas), as compared with the value which is restored after parturition, is exactly compensated by the greater activity of the respiratory mechanism for removal of the carbon dioxide. Hasselbalch, indeed, has shown that the respiratory regulation of the hydrogen-ion concentration is brought about by an increased sensitivity of the respiratory center to the presence of carbon dioxide. The regulation, therefore, is perfectly automatic.

*Metabolism in the Puerperium.*—The first few months of pregnancy may well be described as a contest between the new organism and the old. The new, with its intensely active proteolytic enzymes, is concerned with getting a foothold upon a supply of nourishment. When its activities become too aggressive or the maternal reaction is not quite up to normal, the result may be a severe disharmony. Otherwise, the contest results in a compromise, the mother conferring nutriment and protection in exchange for stimulus to her own organs. But there comes, by what precise causes we shall not stop now to inquire, a limit to this tolerance on the part of the mother, and parturition ensues. What readjustments in metabolism of the mother do we witness after the separation? The necessity for retention of building materials is, for the immediate future, somewhat less even though the child is to be nourished by the mother; for intrauterine life was dependent upon the maintenance of many adventitious structures, some of which, being no longer required, are thrown away, and others are restored to pregestation size. The first change we might expect, therefore, would be the disappearance of the positive balance for the several elements, which has been described, and its replacement by a negative balance. Only the nitrogen balance has been studied in women during the involution period but it is safe to say that what holds for this element will in general be true of the others; sulphur, phosphorus, calcium, magnesium.

The chief source at least for the extra nitrogen found in the urine is the involuting uterus; for Slemons(8r) has shown that a woman who withstood Cesarean section and prolonged anesthesia excreted only 40 grams more nitrogen in the urine during the puerperal period of twenty days than during the postpuerperium, while a

uterus removed from another woman of the same race contained 38 grams. Making some allowance for the effects of anesthesia, some for the difference between the two uteri, and some for lochia, the correspondence is as close as could be expected. The woman whose uterus was removed by the Porro operation should have excreted about 35 grams less than the one whose uterus went through involution following conservative Cesarean section. Less than this difference would have indicated the loss of nitrogen from other tissues. As a matter of fact, while on a similar diet and after anesthesia of similar duration, she excreted 61 grams less, a discrepancy which Slemons thinks was attributed to other differences between the two cases. In view of the enormous total retention of nitrogen outside of the genital tract which has been made out by Hoffström, Landsburg and Wilson, the occasion for surprise is that all of it apparently is conserved during the puerperium, doubtless in the interest of lactation. The nitrogen output reaches its maximum on the fifth day for the dog and on the sixth or seventh for the woman.

Taking the period just before delivery as a standard, the following changes in the distribution of nitrogen in the absolute sense are observed in the period immediately following: The urea nitrogen and the creatin always rise, the ammonia remains the same, the creatinin falls, and the monamino-acid nitrogen falls. In percentage of the total the urea nitrogen may either rise or fall, depending upon the adequacy of the diet in the first few days after delivery and upon the rate of retention for milk production, as against the rate of involution a little later. Where sufficient care is exercised in the collection of the urine, it will be found in normal cases that the percentage of ammonia always falls, owing to the rise in the total nitrogen. There is no acidosis characteristic of the puerperium. The absolute decline in the creatinin excretion, Longridge(82) believes, is explained by the reduction in mass of active muscle. The creatin fraction only calls for more extended remarks. Having in mind that creatin had been identified in smooth muscle(83) and that in wasting diseases, muscular dystrophy especially, creatin always is found in the urine, Shaffer(84) and I(85) independently ascribed the creatinuria of the puerperal period to the involution of the uterus, and this view was generally adopted. Mellanby(86), however, sharply challenged this explanation by showing that a woman may excrete even more creatin after the uterus is removed than another who has been through essentially the same operative ordeal

without hysterectomy and the facts have since been corroborated by Morse(87).

The observations of both Mellanby and Morse leave something to be desired in the way of control of the diet. The *experimentum crucis* is, of course, a very exacting one. Both patients, the one after simple Cesarean section, and the other after the Porro operation, must be upon an adequate diet, which, of course, should be creatin-free, from the moment food can be taken. Most operated patients of this character could not take a diet adequate to protect the body against loss of creatin and if they could the further difficulty would at once be presented as to whether the more radical operation would not of itself cause loss of creatin. Both observers have, in fact, proved too much. In order to show that the creatin does not have its origin in the uterus, it would be sufficient only to prove that just as much creatin is excreted by a patient following removal of the organ as by another in whom it is left in place. But in all three cases, one studied by Mellanby and two by Morse, *more creatin was found after the radical operation*, a fact which points to less complete nutrition or some other vitiating circumstance of the radical operation. Once this is admitted, does not the validity of the whole comparison fall down?

Soon after Mellanby's paper appeared, Bailey and I attempted to test the matter on dogs, by removing the uterus several days after parturition, maintaining the animal both before and after operation on the same creatin-free diet. Out of four attempts only one succeeded; *i.e.*, in only one case did we succeed in inducing the animal to consume an adequate diet of creatin-free materials throughout. This dog showed the higher excretion of creatin after the operation, but we are almost convinced that the result was due to the acidosis incident to anesthesia.

Mellanby offers some evidence that the excretion of creatin is in some way associated with the activity of the mammary glands; for example, when the milk is delayed, creatin in the urine does not appear and the curve of creatin excretion runs parallel with the curve of milk production.

### C. THE ENERGY METABOLISM.

Growth and maintenance of cells are dependent upon two fundamental properties of protoplasm which ordinarily are regarded as quite distinct because in the adult they may vary quite independently. In the developing ovum, however, we are beginning to see how they may be very closely related. One of these properties, the

ability to attract and incorporate into its own structure and thus vitalize germane materials, has been discussed for the fetus and the effects of this intrauterine growth upon the protein metabolism of the mother have now been passed in review. The other fundamental property is the ability to activate oxygen so that without raising the temperature to the kindling point for the oxidizable materials, energy may be set free by oxidation.

Growth is even more dependent upon oxidation than is mere maintenance of the body. Warburg(88) has made the interesting suggestion that the purpose served by oxidation in cells which do no external work, is to maintain the internal structure of the cell. Certain properties of semipermeable membranes, such as the electric charge, are preserved, thereby preventing mixing of the constituents by diffusion. Internal structure, Warburg believes, is necessary also to provide surfaces for condensation of the catalysts which are active in the cell processes. Now Meyerhof(89) has shown that the "caloric quotient" of developing eggs is considerably lower than in adult organisms. By "caloric quotient" one means the number of gram calories of heat produced for each milligram of oxygen consumed. In resting adult organisms it varies from 3.2, where protein is the source of energy, to 3.5, where carbohydrate is the source, the value for fat lying between these extremes. In developing sea urchin eggs it is 2.5 to 2.9, thus indicating that oxygen is being used extensively for some other purpose than heat production. Following Warburg's suggestion, we may suppose, then, that more oxygen is needed to maintain the structure because more catalysts are at work or are working more actively, or, as Lyon(90) has suggested, the oxygen may be used directly in the synthetic processes of growth. On either supposition we see how the substance metabolism involving transformation chiefly of proteins may be closely related in the embryo to energy metabolism.

Warburg(91) has recently repeated many of his earlier studies on the respiratory exchange of the sea urchin egg and has confirmed them in all essential respects. The oxygen absorption of the unfertilized ovum is about five hundred times that of the sperm cell of the same species. But when the two cells unite in the act of fertilization the oxygen absorption goes up to about 3500 times that of the sperm. This increase to sevenfold the metabolism of the unfertilized egg takes place in ten minutes. At the end of six hours it is twelve times and at the end of twenty-four hours, when the gastrula stage is reached, it is twenty-five times the absorption before fertilization.

It is safe to say that something like this happens in the mammalian ovum upon fertilization. But we cannot study the metabolism of a mammalian ovum at such an early stage. It is not until well beyond the middle of pregnancy that the respiratory exchange of the single fetus is large enough to be measured by existing means. We shall limit our inquiry here to two questions: (1) what kinds of material are oxidized to furnish the energy in the fetus and new-born; and (2) how much energy is thus set free in the pregnant woman and the new-born child in comparison with the adult?

*The Respiratory Quotient of Development.*—Qualitative differences in the energy metabolism of the embryo depend upon the kind of material supplied by the mother. The hen supplies only fat and protein in the egg; hence the respiratory quotient during development into the chick can never be higher than 0.78. Chemical studies of eggs before and after incubation by Liebermann(92), the calorimetric determinations of the heat of combustion before and after incubation by Tangl(93), and the metabolism studies (using both direct and indirect methods) by Bohr and Hasselbalch(94), all agree in showing that the material oxidized in the development of the chick is fat.

Regarding the source of energy for mammalian development our information is extremely scanty. Cohnstein(17), analyzing the blood of the umbilical vein and artery of the sheep embryo, found respiratory quotients of 1.0 and 1.6, respectively, in two cases. Bohr(95), measuring the total respiratory exchange of the pregnant guinea-pig before and after clamping an umbilical cord, noted differences which gave a respiratory quotient for the embryo in the neighborhood of unity. These are all the recorded observations on the respiratory exchange of the fetus directly. Such as they are, they indicate plainly that the source of the energy is carbohydrate, the most readily diffusible of all the food stuffs. Several observers have noted a rising respiratory quotient during pregnancy in both lower animals and the human subject and there is no doubt, from the observations of Carpenter and Murlin(96) and Hasselbalch(97), that the quotient is higher just before parturition than just after, but it is not certain to what extent the limited diet usually allowed the puerperal mother in the first days after delivery is responsible for the difference.

The respiratory quotient of the new-born has been for some twenty-five years a matter of recurrent interest. The earliest observations by Mensi, Scherer and Babák have turned out to be wholly untrustworthy because of imperfect technic. Murlin(98)

reported in 1908 that the respiratory quotient of the new-born puppy was in the neighborhood of unity. Hasselbalch(99), in 1904, and Weis(100), in 1908, were the first to observe that the quotient for the new-born infant, also, is high, often in the neighborhood of unity, and indicating the combustion of carbohydrate. Without knowing of these results because they were published in obscure places, Bailey and Murlin(101) obtained quotients of the same character in two infants observed at six hours of age. They confirmed Hasselbalch's observation, also, that the quotient falls rapidly after the first few hours, and on the second day before food was given they found it slightly below the quotient of pure fat combustion and indicating a certain degree of starvation acidosis. The interpretation placed upon these observations by Hasselbalch and by Bailey and Murlin was essentially the same; namely, that the child is born with a sufficient supply of carbohydrate to supply its energy requirement for a portion of the first day, but that this supply is quickly exhausted and the child should be fed very early. Benedict and Talbot(102), in a long series of determinations on new-born infants, however, have failed to find the quotients uniformly high in the first hours, although they admit that the majority of the cases observed within eight hours of birth gave quotients above 0.80, whereas the majority of those observed after eight hours gave quotients below 0.80. Two reasons for the discrepancy found by the different authors may be mentioned. One of these is given by Hasselbalch; namely, the state of nutrition and the maturity of the child when born. In his series Hasselbalch was certain that the better the nutritive condition of the infant, the higher was the quotient, and the average respiratory quotient for prematurely born infants was below that of infants born at term. The other reason, I believe, is found in the level of the blood sugar at the time the child is born. When the mother has a severe labor or when an anesthetic is necessary, the blood sugar of the mother, as well as that of the fetus, according to Morriss(18), rises. In the former circumstance it may rise in the fetal blood to 0.12 per cent. and in the latter to as much as 0.14 per cent. These are distinct degrees of hyperglycemia and might very well sustain the respiratory quotient at an unusual level for several hours. Hence, we might well expect the quotient of the new-born, following a prolonged and severe labor, to be high. Indeed, Hasselbalch draws especial attention to one of his prematurely born infants delivered by a forceps operation, because it gave a quotient higher than others of like age. When we remember that large, well-developed babies cause more prolonged labor than

small or prematurely born babies, we find another reason for Hasselbalch's discovery that the former present the higher quotients.

*Quantity of Energy Required in Development.*—With the exception of a few wholly untrustworthy observations of Cohnstein and Zuntz(17) on the embryo sheep, in which the authors undertook to measure the total oxidation by analysis of blood drawn from the umbilical vein and artery, the only direct studies of the energy metabolism of the mammalian offspring before birth is that of Bohr(95). Bohr operated a pregnant guinea-pig so as to expose the umbilical vessels. With the anesthetized mother immersed in a warm bath of salt solution he then measured the respiratory exchange through the maternal system before and after clamping one of the umbilical cords so as to exclude entirely the one fetus. From the differences obtained he calculated the metabolism of the young near term at 509 c.c. of carbon dioxide given off per kilogram and hour as against 462 c.c. for the mother, an increase of about 10 per cent.

Rubner(103) in 1908 expressed the belief that his law of surface area applied to the embryo as well as to the new-born. Assuming the average weight of each individual at birth to be 8 per cent. of that of the mother, he calculated that the energy metabolism per unit of weight of any new-born mammal would be approximately twice that of the mother. Because the fetus is much less active than the new-born, its metabolism, so Rubner held, should be considerably less than this, which indeed Bohr's fragmentary results indicate is the case.

We shall return to the new-born later. Meantime one gets very little help either from Rubner or Bohr in forecasting what the effect of the fetus would be on the total metabolism of the mother. Granting that its energy requirement is greater than the same weight of maternal tissue, we must remember that a large part of the increased weight at the culmination of pregnancy takes little or no part in the metabolism; fluids none at all; membranes and cord, next to none; placenta, uterus and mammaries, probably not more than so much maternal matter. The net effect, therefore, would be a sort of algebraic sum of high, low and medium metabolism added to that of the mother's. As a matter of fact, the earlier observations on pregnant animals give conflicting results. While Reprew(51), working with rabbits, guinea-pigs and a dog, reported no increase in metabolism per unit of weight, Oddi and Vicarelli(104), working with mice, found a marked increase. Magnus-Levy(105), also, in the first observations on the energy metabolism of the pregnant

woman ever recorded, noted an increase in oxygen absorption from 2.8 c.c. per kilogram and minute in the third month to 3.3 c.c. in the ninth, a rise of 17 per cent.

My own observations(106) on the dog made on the third day before parturition in a pregnancy from which only one pup was born, show an increase of 6 per cent. per unit by weight over that of complete sexual rest, while on the corresponding day of a later pregnancy in the same dog from which five pups were born the increase was 28 per cent. The extra metabolism was proportional to the weight of the new-born delivered.

TABLE SHOWING THAT EXTRA HEAT PRODUCTION OF PREGNANCY IS PROPORTIONAL TO WEIGHT OF OFFSPRING TO BE BORN

FIRST PREGNANCY					
DAY FROM PARTURITION	WEIGHT IN KG.	TEMPERATURE OF CAGE	CALORIES IN FOOD	TOTAL ENERGY PRODUCED	RETAINED
THIRD BEFORE (JUNE 23)	14.5	28.0°C	907.4	551.3	356.1
PARTURITION (JUNE 26)	ONE PUPPY BORN: WEIGHT, 280 GM.				
SEXUAL REST; AFTER LACTATION					
THREE WEEKS AFTER PARTURITION (JULY 13)	13.78	28.1°C	907.4	505.3	402.1
SECOND PREGNANCY					
THIRD BEFORE (DEC. 11)	16.86	27.1°C	907.4	763.8	143.6
PARTURITION (DEC. 14)	FIVE PUPPIES BORN: WEIGHT, 1560 GM.				
551.3 - 505.3 = 46.0 CALORIES FOR 1 PUPPY WEIGHING 280 GM.					
763.8 - 505.3 = 258.5 CALORIES FOR 5 PUPPIES WEIGHING 1560 GM.					
$\frac{280}{46} = \frac{1560}{258.5}$					

FIG. 9.—Extra heat production in a dog just before parturition in two different pregnancies. From the first one pup was born; from the second, five.

In the woman pregnant with a single fetus the observations of Zuntz(107), Carpenter and Murlin and Hasselbalch agree in showing an extra metabolism near term of about 4 per cent. over that of the same woman or other women in complete sexual rest. All of these authors surmise that this is scarcely more than may be accounted for by the increased respiratory activity necessary to preserve the hydrogen-ion concentration of the mother's blood. It is evident, then, that the total product of conception added to the mother's body, functions as so much maternal tissue—the higher metabolism of the embryo being just counterbalanced by the inactive and relatively inactive structures.

Assuming the applicability of Rubner's law of surfaces to the new-



born pup, with the same constants as for the adult dog, it was calculated that the theoretical metabolism necessary to maintain in muscular rest a new-born pup weighing what the fetus actually weighed would be just equal to the extra metabolism of pregnancy. In other words, if the new-born pup were to lie perfectly still and sleep as quietly as the fetus does, the increased metabolism at room temperature over the metabolism at its mother's body temperature would just compensate the metabolism of the placenta, uterine wall, etc., and the total requisition placed upon the mother for maintenance of the new-born by food from her mammary glands would not, for the first days at least, exceed the requisition made upon her body in the last days of pregnancy by way of the placenta. Here appeared a very important principle of adaptation, the requirements of the new-born being just equal to the requirements of the total product of conception, accessory structures included, just before parturition. It was impossible to demonstrate the principle with absolute certainty on the dog because of the mother dog's anxiety for the offspring in the first days after parturition. It was demonstrated a year later, however, by Carpenter and Murlin (96) on three cases of human pregnancy at the nutrition laboratory in Boston. These three cases, two primiparæ and one multipara, were observed in the bed calorimeter for some three weeks previous to parturition and mother and child together were placed in the calorimeter again as soon as possible thereafter. The mothers were soon trained to lie perfectly still and by keeping the infants awake for several hours just before the calorimeter periods, they were readily induced to sleep throughout or nearly throughout the observational period of two to three hours. In two of the cases the comparison of antepartum and postpartum metabolism of mother and offspring together showed a difference of less than 1 per cent. The other case showed an increase of 7 per cent., partly because the antepartum observations did not occur closer than the thirteenth day before delivery and partly because the child cried on two out of three occasions while in the calorimeter in the later experiments. Ruling out the factor of muscular activity as we are able to do in the two cases, the curve of total energy metabolism of the mother and offspring suffered no deflection at parturition. It is a remarkable fact that the increase in oxidation in the child's body when it passes from the warm environment of its mother's uterus to the colder environment of the outside world (in bed beside its mother), supplying its oxygen now by its own lungs instead of from the mother's placenta, should so nearly compensate the oxida-

tion in the accessory structures which supported it *in utero*. Just how much the child's metabolism is altered by the changed environment and changed circulation we have no certain means of knowing. That it is considerable, that the change represents, indeed, a turning-point, in the quantitative sense as well as in the mode of nutrition, is evident from what has been said already as well as from what will follow immediately. The demands upon the mother's digestive system, however, are not greater. She is called upon to supply the same amount of energy in potential form to herself and child immediately after parturition that she did to herself and child immediately before.

The rate of oxidation or heat production per unit of weight for the puerperal woman in these three cases was 11 per cent. higher than the average for eight nonpregnant women and 7 per cent. higher than that of the same subjects just before delivery, a difference which may be ascribed in part to the increased activity of the mammary glands and in part to the stimulating effect of the products of involution. Since these products are protein in nature they would unquestionably stimulate metabolism in the same way as Lusk (108) has shown for the amino-acids.

*Metabolism of the New-born.*—The energy production of a grown person in health and while resting in bed may be stated as approximately 1.0 calory per kilo of body weight per hour (Du Bois). The average for eight normal nonpregnant women between the ages of eighteen and fifty-five years under these conditions was found by Carpenter and Murlin to be 0.99 calory per kilo an hour and the average for three normal puerperal women was 1.09 calories.

The only direct comparison ever made between the metabolism of the new-born infant and its puerperal mother were reported by Carpenter and Murlin in the work to which reference has been made. The infant's metabolism was measured by difference between the metabolism of mother and child taken together and that of the mother taken alone. The average age of the infants at the time of the observations on the mother alone was ten days. The metabolism was found to be 2.8 calories per kilo an hour or 2.5 times that of the mother. When we compare the metabolism per unit of body surface, as calculated by Meeh's formula, we find that of the child somewhat less than that of the mother. Nothing could better illustrate the applicability of Rubner's law of surface to persons of different size and widely different physiological conditions than the data from this comparison. The pregnant woman just before delivery, the same woman two weeks after delivery, weighing 9 to

10 kilograms less, and the child weighing one-sixteenth to one-twentieth the weight of the mother—all produce the same amount of heat per unit of surface.

TABLE VII.—ENERGY METABOLISM OF MOTHER AND CHILD TOGETHER BEFORE AND AFTER PARTURITION (CARPENTER AND MURLIN).

Case Mean of all days before and after delivery	Respiratory exchange				Energy production, calories per hour					
	Average body temp. °C.	CO <sub>2</sub> gm. per hour	O <sub>2</sub> gm. per hour	R. Q.	a—Direct	b—Indirect	$\frac{a+b}{2}$	% difference	per kg.	% difference
Case 1— 1st, 4th and 6th before de- livery.....	36.75	21.3	18.4	0.85	60.0	61.3	60.7	....	0.96	....
2d, 5th, 12th, 14th and 17th after delivery.....	36.9	20.2	18.5	0.80	61.2	61.2	61.2	+0.87	1.11	+15.6
Case 2— 13th, 17th, 19th, 20th and 22d before delivery.....	36.68	22.3	19.6	0.83	63.6	65.9	64.7	....	1.11	....
2d, 5th and 11th after de- livery.....	36.8	21.7	20.4	0.78	71.1	67.5	69.3	+7.1	1.32	+18.9
Case 3— 1st, 3d, 17th, 21st and 24th before delivery.....	36.64	23.9	20.2	0.86	72.2	68.7	70.6	....	1.02	....
4th, 8th and 11th after de- livery.....	37.23	23.1	20.3	0.81	70.8	68.6	69.7	-0.9	1.11	+ 8.8

As sometimes happens in scientific work, the beauty of a comparison of this sort is marred slightly by more accurate data. Since this work was done (nearly eight years ago), observations by Benedict and Talbot and by Bailey and Murlin have shown that the metabolism of the sleeping, new-born infant is nearer 2 calories than 2.8 per kilogram an hour and 25 calories rather than 30 per square meter an hour, in both respects distinctly lower than the metabolism under similar conditions for the adult. Note that this fulfills exactly the estimate made by Rubner on purely *a. priori* ground.

Bailey and Murlin were fortunate enough to have as subjects two infants of widely different body weight born on the same day just three hours apart, so that it was possible to study them successively at exactly the same age. This comparison illustrates the influence of body fat on the heat production. The larger infant has the lower metabolism on the basis of weight, but the two have nearly the same metabolism on the basis of surface.

TABLE VIII.—ENERGY METABOLISM OF TWO NEW-BORN INFANTS OF DIFFERENT WEIGHTS TAKEN AT THE SAME INTERVALS AFTER BIRTH (BAILEY AND MURLIN).

Weight, kgm.	Age, hours	R. Q.	Cal. per hour	Cal. per kgm. and hour	Cal. per square meter and hour (Meeh)
W. 2.9	6	1.12	5.649	1.94	23.67
B. 4.6	6	0.85	6.724	1.46	20.43
W. 2.82	31	0.66	6.255	2.22	26.54
B. 4.49	31	0.67	8.704	1.94	26.87
W. 2.75	80	0.70	5.972	2.18	25.57
B. 4.27	80	0.73	7.101	1.66	22.67
W. 2.75	104	0.70	5.252	1.83	21.85
B. 4.27	104	0.73	7.500	1.77	23.47
W. Average	....	....	5.782	2.04	24.43
B. Average	....	....	7.514	1.70	23.36

Benedict and Talbot(109) explained such differences as this on the assumption that fat replaces active tissue. They said, therefore, that the lean infant has a higher metabolism per unit of weight than the fat one because he has relatively more active tissue. It turns out, however, as we were able to show, that fat does not replace active tissue but replaces water. Hence, we are driven back upon the old explanation which Rubner himself gave; namely, that the lean infant has the higher metabolism because he loses heat faster. He has a larger surface in proportion to weight and, since it is through the surface that heat is lost, it will be in proportion to surface that heat must be produced if the body temperature is to remain constant.

A comparison of the energy metabolism of infants through the first year of postnatal life made by Benedict and Talbot and by Murlin and Hoobler(110) reveals a rapidly progressing increase. Starting at a level below that of the adult, the nursling reaches the adult level at about the second month, and from this time on, while traversing the period of most rapid growth, the period of highest milk consumption, it arrives at the apex of the metabolism curve, somewhere between one and two. From this point on to old age (with the exception of a slight mount at the time of puberty) the rate of oxidation in the resting body is steadily receding.

This lecture opened with emphasis upon the independence of the

embryo. The enzymes which enable it to secure materials for its own nourishment from the mother are really a part of the mechanism of heredity. After producing the ovum the mother has no further influence on the hereditary factors. The enzymes of the embryo,

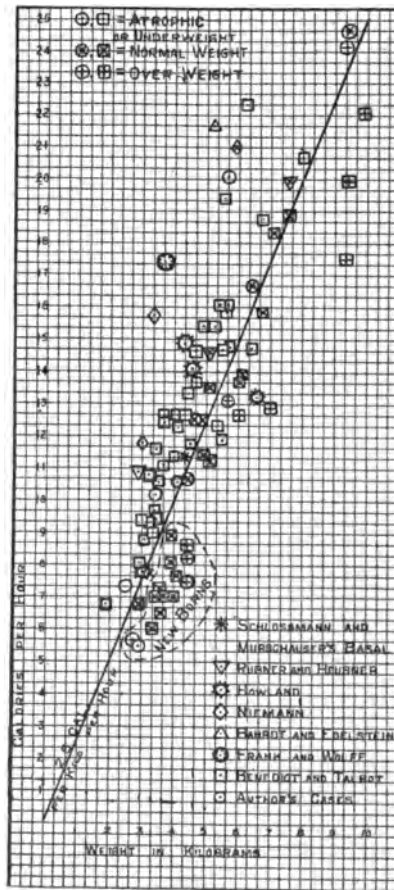


FIG. 10.—Chart from Murlin and Hoobler showing relation of heat production to body weight in infants. Methods of von Pettenkofer or Regnault-Reiset.

however, can act only on certain proteins—the proteins of its own species.

After a period which may well be called *parasitism* the new and the old organisms become accommodated one to the other and enjoy a period of what Bar has denominated “harmonious symbiosis.” The harmony applies to both substance and energy metabolism. The

maternal metabolism is nicely adapted to the physiological alteration due to pregnancy and the fetus, with all its adnexa, asks for no more in the way of energy than does the same weight of maternal tissue. We conclude now by calling attention once more to signs

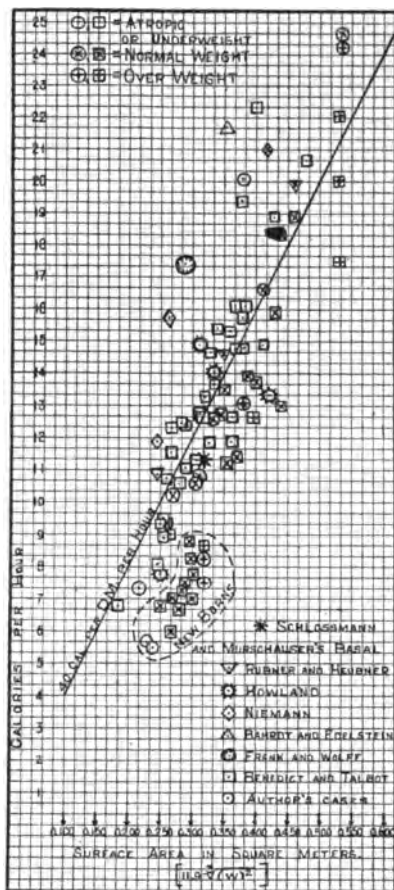


FIG. 11.—Chart from Murlin and Hoobler showing relation of heat production to skin surface in infants. Methods of von Pettenkofer or Regnault-Reiset.

of an independent behavior in the metabolism of the offspring. The low rate immediately after birth is probably due to the fact that the heat-regulating mechanism is not yet complete; the higher rate beyond the second or third month is doubtless related to the more active growth.

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## SOME GENERAL OBSERVATIONS UPON ANTENATAL PATHOLOGY.\*

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OBSERVATION, speculation and study of monstrous infants and of gross developmental errors have occupied the minds of men from the time of the beginning of recorded facts, but until comparatively recently (the work of the St. Hilaires appeared in 1822), the observation has been cursory, the study negligible and the speculation an absurd mixture of medieval superstition and biological falsehood. Even now the great subject of antenatal pathology is assumed by many medical men as being entirely contained within the confines of teratology, a grievous error. It must be remembered that the child is by no means a little man, that physiological processes, both normal and pathologic, differ greatly in the infant and the adult and that the manifestations of disease vary within wide limits in the developmental and mature epochs of life.

The entire period for intrauterine life, forty weeks, represents a trifle more than 1 per cent. of man's terrestrial career, if the classic expectation of life, three score and ten years, be taken as a basis; but if the relation between prenatal and postnatal life be measured by events rather than by time alone, the prenatal period is seen to

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be crowded with morphologic changes and developments, compared to which all the physical phenomena which may occur during the entire passage of extrauterine life, are but trifles.

If we consider that within the short space of forty weeks, the microscopic ovum united to the equally microscopic spermatozoon, grows into an organism 8 or more pounds in weight, with all of its many viscera and systems of viscera completely organized to maintain life and further that in this period are laid down the potentialities for the indefinite continuation of the species, the relative importance of antenatal life will readily be understood.

Between the intrauterine existence of the fetus and postnatal life, there lies the mechanism of parturition and the twelve hours or so which the fetus spends in traversing the birth canal has been well said to be the most momentous epoch in the life of the individual and the one most fraught with dangers and accidents, any one of which may entirely change the subsequent course of his life.

It is the grouped study of these phenomena and occurrences of prenatal and intranatal life, their effect upon the individual, their relation to other departments of biology, medicine and sociology, that truly constitutes antenatal pathology.

The relationship of the subject with pediatrics is obvious, but the interaction between it and certain other branches of medicine are more remote though equally definite; for example, a mother suffering from the toxemia of late pregnancy gives birth to an infant which, although intoxicated with the protein poison, eventually recovers and grows to maturity. Now it seems perfectly fair to assume that in the event of this individual becoming a victim of nephritis, of hepatic disease or indeed any severe disorder of metabolism, the general principles of protein intoxication and of anaphylaxis will become operative and the reaction to the toxic process will be decidedly more marked, and the resistance to metabolic disturbance much less than in a similar case where there had not occurred a profound protein poisoning at the time of birth.

In our own field of obstetrics and gynecology such examples of obscure relationship are fairly common. A fetus may exist with an insufficient thymus secretion and may present no symptoms of disease whatever during infancy and childhood, yet there may have been such serious interference with osteogenesis, that when the infant becomes a woman, the pelvic arch is found so deficient or to have suffered so marked an arrest of development as to make parturition a distinctly pathological process.

These examples of the close interdependence of antenatal pathology to postnatal conditions might be multiplied indefinitely.

Suffice it to say that its ramifications extend into every department of medicine to a greater or less extent.

Antenatal life, though occupying so comparatively short a time, is so intensive, and is made up of so many almost conflicting factors, that for a proper understanding of its biology it must be divided and subdivided into periods which will correspond with the particular character of the phenomena occurring during these divisions of time. Here I have closely followed Ballantyne, whose description of antenatal physiology is scarcely to be improved upon.

First, there is the germinal period, not truly a portion of intra-uterine existence, since it reaches back to the independent existence of the ovum and the spermatozoon, but of the greatest importance in that herein lie all these mysterious forces, transmitted potentialities and characteristics, both dominant and recessive, the sum total of which we call heredity. Next, we have the short and hazy period of conception, first when both mature ovum and spermatozoon have been deposited in the cavity of the uterus and lie apart, and, second, when impregnation has taken place and the blastodermic vesicle is forming. Then follows the important embryonal epoch, beginning with the formation of the primitive streak and including the first six weeks after conception. It is during this short time that the ground work and plan of the mature fetus are laid down. Organogenesis is its most essential feature. The cellular basis for future organs is now established, and it is during this embryonic period that the more gross malformations and terata are first noted. Arrest of development during this time leads to marked abnormalities, frequently of a character incompatible with life; fetal death and maternal abortion being a natural sequence. It is during the embryonal period that the effect of inheritance of physical characteristics become operative, and here are established those transmitted peculiarities which are inherent in the germ plasma and the chromosomes of the ovum or spermatozoon.

It has been clearly shown, too, that terata may be formed during the embryonal period by a faulty implantation of the ovum due to some external influences which interfere with the nutrition of the embryo.

Mall, working with human embryos, the products of spontaneous abortion, reached the conclusion that the power to become a monster is present in every ovum, provided the conditions surrounding the ovum be inimical to normal development.

This very important generalization runs parallel to that of Hertwig, who, after an elaborate experimental work upon the production of spina bifida in frogs' embryos, by the use of a solution of sodium chloride, made the statement that any human ovum may become a monster, either anencephalic or otherwise, and that this is not necessarily due to any abnormal condition of the germ, but to external influences which affect the growth of the egg.

During the embryonic period we have, then, two great factors which may be causative in producing abnormal development, hereditary influence or disturbance in the germ plasm, and traumatism or intoxication of the embryo from external causes.

Immediately following the embryonal, there is recognized a vague neofetal period of about two weeks' duration, during which the placenta is completed and its circulation developed and adapted to the needs of the fetus. During this time the pathological changes which usually occur are circulatory in their nature, due to some error of adaptation of the fetal and maternal structures to the newly formed placental circulation.

Then follows the great fetal period, or the time of enormously rapid growth and hyperplasia. From the eighth to the fortieth week of pregnancy, growth is the keynote of fetal development. The plan of the body has been laid down, the essential cells are in place, and there remain but their multiplication and increase along the lines arranged during embryonal life to complete the mature fetus.

It must be remembered, however, that growth and organogenesis do not move along in parallel courses, all organs and systems of organs developing at a uniform rate and reaching maturity at the same time. On the contrary, the growth and development is markedly irregular. The reproductive tract, for instance, does not reach maturity at all during intrauterine life, but its organs remain undeveloped for nearly two decades of postnatal existence, when, with puberty, their full growth is reached. So, also, with the epiphyses of bones, teeth, hair, the mammary glands, and so on.

On the other hand, certain organs reach maturity early in intrauterine life and are already retrograding at birth. The thymus is a clear illustration.

If arrest of development should occur during this period of growth, one organ or system of organs is more apt to be affected than the entire fetus, since, as has been pointed out by the writer in a previous article, all organs or systems of organs attain their growth not synchronously and regularly, but irregularly, each group having a period of maximum rapidity of development and cell reduplication,

the neighboring tissues remaining fairly quiescent during this period. It is this event in the developmental cycle of the organs, or system, which has been termed the critical period. Furthermore, there is a mutual inhibitory mechanism acting between neighboring organs or tissues, by which the size and extent of growth of each part is regulated. Should the inhibitory mechanism be disturbed by error in development of one organ or tissue, the effect would naturally be to increase the growth of the related tissues, either along the normal line, or, by reason of the control being lost, to force development into abnormal directions. This will explain the occurrence of many of the minor forms of abnormal tissue formation which take place during the fetal period and have underlying them some disturbance of the maternal growth control, the disturbance being brought about by nutritional insufficiency or similar agent.

The fetal period is ended by the phenomena of birth, by which process the fetus changes from a parasite, existing solely by reason of its maternal blood supply, into an independent creature, supplying oxygen for its own needs by means of its own self-contained mechanism.

The two weeks after birth have been termed the neonatal period, and during this time the new-born infant is adjusting itself to its independent existence. The heart is being regulated, its valves becoming competent, the heat centers are adjusted to maintain the body temperature constant, regardless of the variations in heat of the surrounding medium, the respiratory and digestive tracts are becoming orderly parts of that wonderfully synchronizing instrument, the human being.

After these two weeks of neonatal adjustment, postnatal life begins, and the events of life follow their appointed steps until death and decay make up the end of the cycle.

The chart (Fig. 1) from Ballentyne graphically illustrates these divisions of antenatal life.

Such arbitrary divisions of intrauterine life are, of course, impossible, and the second chart (Fig. 2) is a more graphic representation of what actually occurs. It will be seen that the organogenesis of the embryonal period contains and extends through all subsequent divisions of antenatal life, and indeed if the chart were extended, would continue up until the third decade of postnatal life, as has been suggested by the late development of the sexual apparatus, bone and so on.

Germinal factors also extend through the succeeding epoch of life,



### SCHEME OF ANTENATAL LIFE

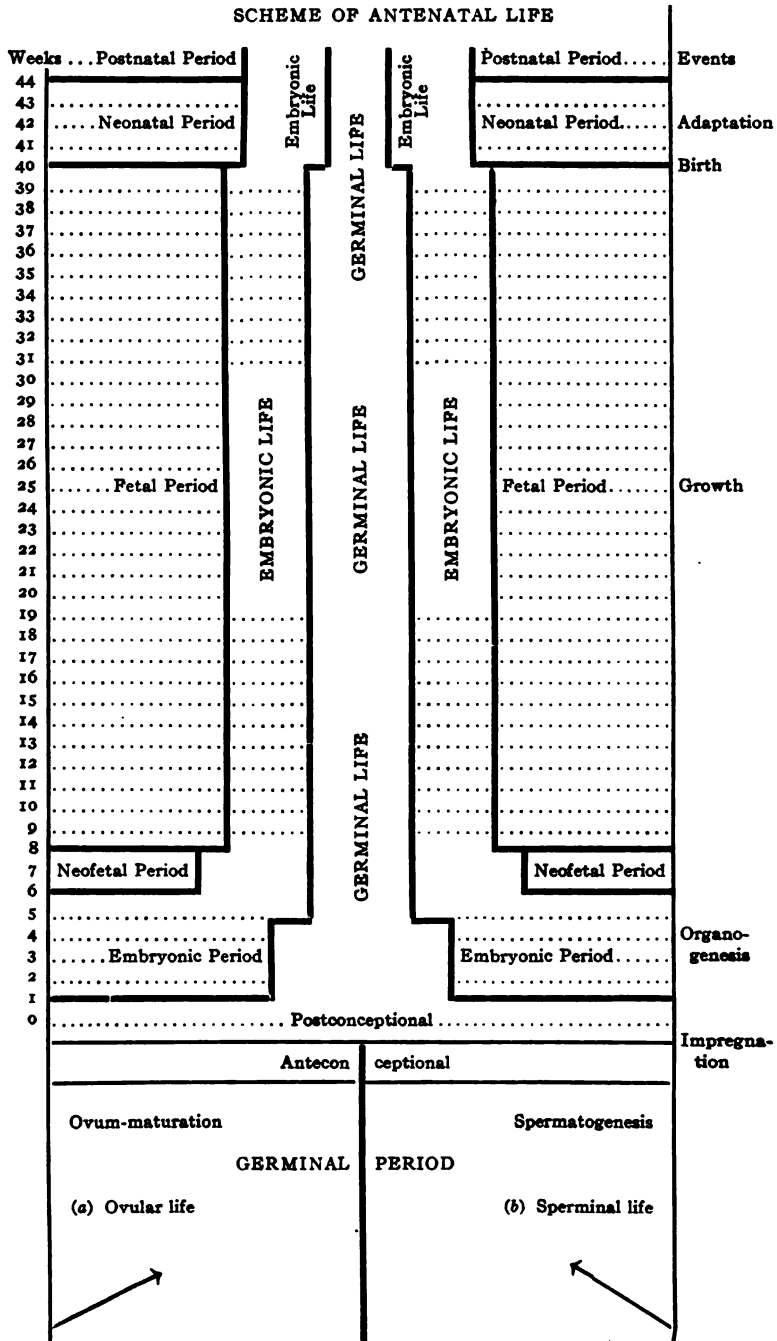
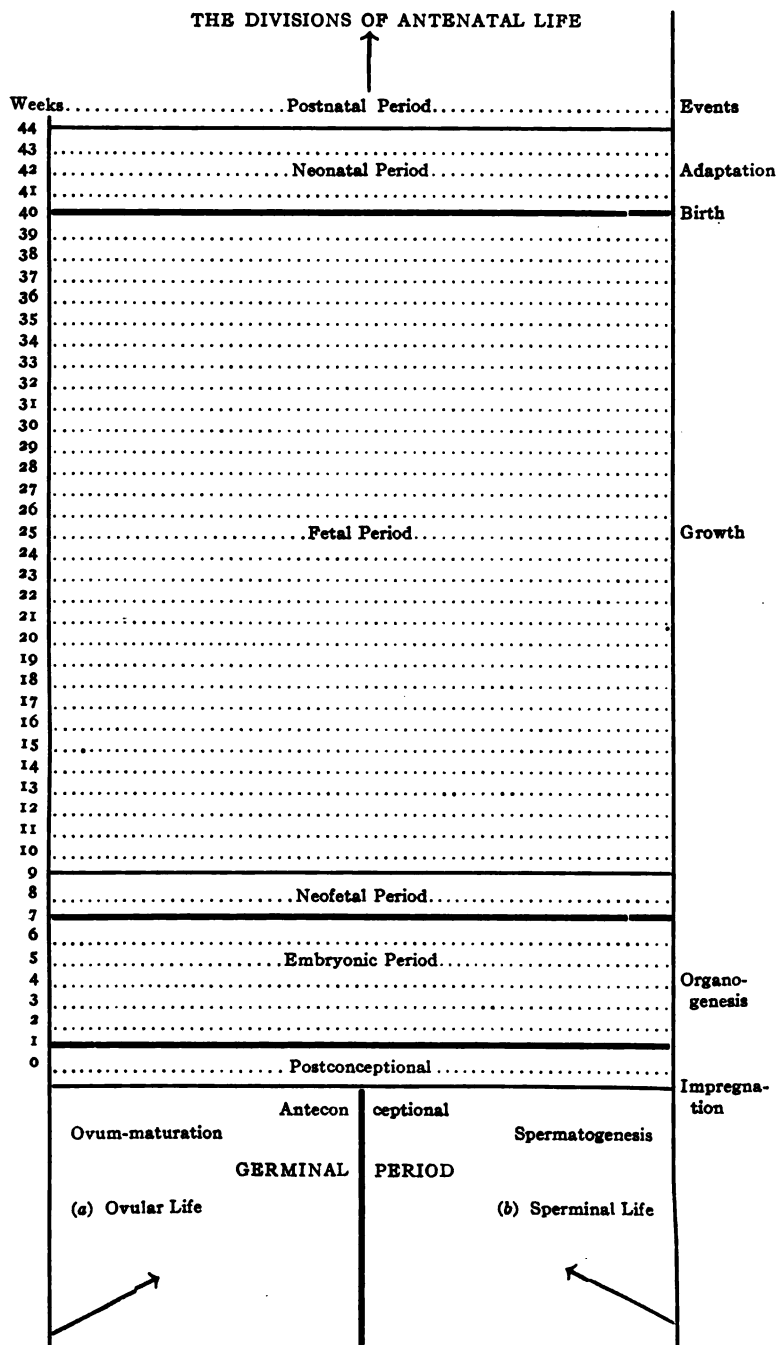


FIG. 1.



providing for the continuity of the germ plasm, growth, however, being the main factor.

Having thus outlined the salient features of the great division of antenatal existence, we may turn to the characteristic pathological changes which may occur in these several periods, and here, as is to be expected, the pathology follows closely with the nature of the biological processes, normal to the corresponding period; or, in other words, the nature of antenatal pathological processes parallels the synchronous normal physiological activities of the fetus.

At the very beginning, we have, then, the ovum and the spermatozoon, lying separated within the cavity of the uterus, and here our pathology is that of these isolated elements, or that of the germ.

Herein become operative all the principles of heredity, and of the transmission of inherited and perhaps acquired characteristics, all of which is beyond the scope of this article. It must be said, however, that our knowledge of the inherited characteristics of any race of civilized man is so imperfect and our history of the breeding laws, sexual selection as opposed to mating on the basis of the expediencies of community life, and so on, is so vague and fragmentary that no accurate generalizations can be formulated. Even the mathematical progressions of Mendel fail in the case of man, by reason of his hybrid and unknown ancestry. It is here that the science of eugenics fails of its purpose, for in order to produce desirable and desired results by mating and crossing of types, there must be some knowledge of the genecology of the subjects, a matter entirely wanting among mankind.

The germinal pathology, then, consists of the morbid transmitted characteristics and tendencies.

The pathology of the embryonic period next concerns us, and here, following the rule, the physiology of the embryo must be recalled in order to understand its pathology. The vital activities of the embryo have been stated to be mostly constructive; the laying down of organs and systems of organs, function in most cases appearing later, but morphology and the specialization of cell groups being the chief factors. The pathology of this period would then obviously be one of disturbances of morphology, abnormalities of form and structure—in a word, the formation of terata. It is in the six weeks or so embryonic life that monsters are produced, though it must be understood that the factors involved in germinal pathology may also carry through that stage, and directly influence the eccentricities of structure which now occur.

The mechanism of monster formation and the theories regarding

it form one of the most fascinating chapters of medical research, and its last words still remain to be written in the far distant future. Out of the maze of theology, debased superstition and fantastic speculation there have emerged certain workable hypotheses, portions of which have been substantiated by experimental evidence.

First, the theory that terata may be caused by faulty implantation of the ovum, with resulting impairment of nutrition and interference with normal physiological processes. The work of Dareste, Mall, Hertwig and many others has emphasized the importance of this view, and experimental proof of the truth of the theory is not wanting. In general, the plan adopted by experimenters has been to subject the impregnated ova of certain easily studied animal forms to mechanical or chemical insult, in order to impair nutrition and provide an unfavorable environment. If such conditions are found to be reproduced within the human uterus, the theory gains greatly in weight.

The work of Mall is strongly corroborative of the truth of the theory of faulty implantation. Mall found that not over 7 per cent. of uterine pregnancies contain pathological embryos, and were the primary cause which produces them located in the germ, he would not expect a higher per cent. in ova from tubal pregnancies. Instead, it is found that 96 per cent. of the embryos in tubal pregnancies are pathological and but 4 per cent. normal, and a study of these ova shows conclusively that the pathological character of the embryo is secondary to primary change in the chorion, due to a faulty implantation, which, in turn, is usually due to some form of endometritis.

The theory of the importance of the amnion to the orderly development of the embryo has also received much attention. Generally speaking, this would seem to be included in the first-mentioned theory of nutritional errors due to faulty implantation, but there may be morbid processes in the amniotic sac without any fault in the implantation of the ovum whatsoever.

The intimate relation borne by the amnion to the embryo, and the close infolding of the forming tissues by this membrane, lead to the inevitable conclusion that imperfect separation of the amnion from the body of the embryo must lead to deformities, and as a result of the unequal pressure exerted on the developing tissues. In addition, there is the evidence adduced from the study of monsters showing the close adhesion of an undeveloped or maldeveloped members to bands of amnion.

The pressure of amniotic bands is not a necessary corollary, however, since it is perfectly reasonable to suppose that areas of marked pressure may exist inside the sac, without any direct adhesion whatever between embryo and enveloping membrane.

With this brief outline of the causative factors, we leave the pathology of the embryo. Contemplation of its intricacies leads the student into turbid and cloudy waters, which are, however, gradually being clarified as experimental evidence and hypothesis draw more closely together.

A study of the pathology of the fetal period, extending from the seventh to the fortieth week of intrauterine life, offers a most fruitful field for scientific investigation, and a distinct hope for the betterment of the new-born child by a practical application of the principles which underly it. Fetal pathology, paralleling fetal physiology, is that of growth. During this time, organs have attained their function in a greater or less degree, and morbid agents produce reactions which are of the nature of disease processes rather than morphological anomalies, as in the preceding period.

Fetal disease is directly comparable with postnatal morbid procedures, with certain essential differences due to the several factors which differentiate the fetus from the infant.

The intrauterine environment is the first of these factors to be recognized. During its entire prenatal life, the fetus is immersed in a fluid medium of unvarying temperature which not only plays an important rôle in its nutrition, but also serves as a protection against traumatisms, against alternations of heat and cold, and against the invasion of the tissues by bacteria. As examples of the influence of this environmental factor may be mentioned the difference between the pustules of variola in the fetus and in the infant, the rarity of wounds and fractures, except when the latter are a result of amniotic adhesions, and many others. Second, there is the enormously important placental influence, which differentiates prenatal from postnatal life. It must be remembered that the fetus is truly a parasite, obtaining its nutriment and the materials for its growth solely from the maternal tissues, and these largely through the medium of the placenta. Inasmuch as fetal existence depends almost entirely upon the mechanism of the placental circulation, it is possible for an embryo so malformed as to be entirely incapable of a moment's extrauterine life, to reach its full term of intrauterine development entirely undisturbed. Complete atelectasis may exist, the kidneys may be mere thin-walled cysts with no secreting tubules whatever, the cerebrum may be almost

entirely wanting, there may be absence or complete stenosis of a considerable portion of the intestinal tract, without any evidence of disturbance in fetal development. Immediately after birth, however, these essential organs being required to perform their automatic function in order that life may continue, are not equal to the task and the infant perishes. Owing to the placenta, then, disease and deformity entirely incompatible with postnatal life may be present in the fetus without any material influence on its nutrition and growth.

Again, the placenta acts as a barrier to prevent the introduction of infective agents to the fetus from the maternal fluids. It is true that this barrier is, at times, penetrated, but the well established fact that the healthy infant is bacteriologically sterile at the moment of birth is conclusive evidence that the placental barrier is effective. That it does break down not infrequently is shown by the common occurrence of infectious disease where the fetus has been inoculated via the maternal blood stream.

The contrary proposition is also true that the placenta is the sole means by which infective agents may reach the fetus, if we accept the apparently negligible potentiality of the liquor amnii in this regard.

It is also true that if the placenta be the seat of lesions or disease, it may be unable to properly supply the fetus, and thus act as an agent for serious damage to that organism. Finally, it seems probable that there is some specific placental secretion or enzyme which may exercise a profound influence upon fetal development. This latter view is as yet unsupported by experimental evidence.

To recapitulate, then, disease in the fetal period is comparable to postnatal disease with the modifying factors of the nature of the fetal environment and the influence of the placental circulation.

Classification of fetal disease is a complex task, and even the most condensed grouping covers practically the whole subject of medicine. Ballantyne's plan is the one which seems to be most workable.

#### CLASSIFICATION OF FETAL MORBID STATES.

##### I. *Transmitted Diseases.*

1. The exanthemata, malaria, etc.
2. Tuberculosis, sepsis, elephantiasis, etc.
3. Syphilis.

##### II. *Transmitted Toxicological States.*

1. Lead-poisoning, etc.
3. Poisoning by morphine, mercury, strychnine, etc.
3. Alcoholism.

III. *Idiopathic Diseases.*

1. Subcutaneous tissue and skin, *e.g.*, general dropsy, ichthyosis, etc.
2. Osseous system, *e.g.*, fetal rickets, achondroplasia, etc.
3. Alimentary system, *e.g.*, fetal ascites, peritonitis, etc.
4. Respiratory system, *e.g.*, pneumonia, hydrothorax, etc.
5. Circulatory system, *e.g.*, endocarditis, hydropericardium, etc.
6. Hemopoietic system, *e.g.*, thyroiditis, thymitis, hepatitis, etc.
7. Genitourinary system, *e.g.*, nephritis, distended bladder, etc.
8. Nervous system, *e.g.*, paralyses, contractures, etc.

IV. *Neoplasms.*

1. Of the head and face, *e.g.*, preauricular appendages, cysts, etc.
2. Of the neck, *e.g.*, cervical cysts, chondromata, etc.
3. Of the trunk, *e.g.*, sacral and coccygeal cysts, fibromata, etc.
4. Of the extremities, *e.g.*, exostoses, lymphangiomata, etc.
5. Of the internal organs, *e.g.*, sarcomata, rhabdomyomata, etc.

V. *Traumatic Morbid States.*

1. Fractures.
2. Dislocation.
3. Wounds.
4. Congenital "amputations."

VI. *Diseases and Morbid Conditions of the Fetal Adnexa.*

1. Placenta, *e.g.*, tubercle, edema, etc.
2. Umbilical cord, *e.g.*, knots, rupture, etc.
3. Chorion, *e.g.*, abnormal vascularity, etc.
4. Amnion and liquor amnii, *e.g.*, adhesions, hydramnios, etc.
5. Decidual membranes, *e.g.*, inflammation, etc.

VII. *Pathology of Fetal Death.*

1. Maceration, mummification, etc.
2. Rigor mortis.
3. Putrefaction.

It is merely possible to glance at some of the most important and common types of fetal disease within the limit of a short paper Syphilis stands out among the transmitted diseases as of special interest. The prevalent idea that syphilis is a frequent cause of early abortion seems to be disproved, it being found that in most cases the fetus is infected in the latter months of pregnancy, when it may die and be prematurely expelled, may be born alive and show signs of an active infection, or may show no signs of syphilis until some months after birth. The mode of infection is now thought by common consent to be through the maternal blood stream, unless possibly there may be a granular "resting stage" in the life cycle of the treponema

*pallida*, at which time the granules may pass into the ovum with the semen. The treponema itself has not been demonstrated in seminal fluid.

It is known that certain toxicological conditions of the mother may in some wise be transmitted to the fetus, but here our knowledge is vague and largely based on inference. Alcoholism in the mother, if at all continuous, does certainly have a deleterious effect upon the developing fetus, but the mechanism of its action is not clear. Such intoxication, together with the various chronic metallic poisons, as lead or phosphorus, cause fetal disease, not by a direct action, but by producing a toxic effect upon the ovum or the spermatozoon they predispose to morbid embryonic states, which, in turn, cause fetal disease. Imbecility, epilepsy and certain organic degenerations seem to follow these poisonings. The idiopathic diseases of the fetus may be defined as all these definitive lesions whose cause is not known. The term idiopathic is at best a poor one, and as used in the classification merely groups the conditions of unknown origin. General edema of the fetus, for example, has been the focus of considerable research. In a study of this condition, presented to the American Gynecological Society, the writer expressed it as his opinion that the disease was primarily of placental origin, an end result of maternal toxemia.

The remaining groups of fetal disease are largely explained by their names, and to discuss them in detail would lead to a review of practically the whole subject of clinical medicine. They are mentioned simply as an illustration of the enormous field covered by fetal pathology.

The injuries and accidents of birth and the irregularities of beginning function in those organs, latent during intrauterine existence but essential to life immediately upon the cessation of placental circulation, constitutes the pathology of the intra- and neonatal period. It has been well said that "birth is the traumatic transition from an intrauterine to an extrauterine existence."

As is to be expected, the diseases of this period are largely (*a*) traumatism, (*b*) infections, (*c*) metabolic disorders due to some fault in the physiological adjustment of the new-born.

Among traumatisms there need only be mentioned cephalhematoma, fractures, birth paralyses, etc., the results of undue pressure exerted upon the fragile fetal body while passing through the rigid pelvis.

The intranatal infections include ophthalmia neonatorum, and possibly mastitis neonatorum.



In the neonatal period, the first few weeks after birth, infections are frequent, tetanus, umbilical sepsis and erysipelas are common examples. It is here that the metabolic disorders due to faulty readjustment are found, icterus, melena, various affections of the skin, or pemphigus, keratolysis.

There now remains for discussion what is really the crux of the entire matter. What practical application are we, as obstetricians, to make of the mass of vague theories, abstract principles and nosological facts contained in a study of antenatal pathology?

Our concern is to better the standards of the community, the race and the species, not so much by an improvement of what we call the normal type (though that is an ideal to be striven for), as to decrease the number of imperfect individuals born, and to lessen in each case the individual imperfection to an irreducible minimum.

This, to my mind, is to be done by approaching the subject from several angles. First, an analysis of the history of the parents in much more detail than is the common practice. It is astonishing what a wealth of data, some of it of enormous importance, may be obtained, first by a searching anamnesis, and, second, by encouraging the establishment and maintenance of a family record of physical events. My friend, Dr. J. Madison Taylor, of Philadelphia, has recently devised an admirable family history in which all events bearing in any way upon the future development of bodily characteristics of each member of the family are easily recorded in blanks provided for the purpose. A careful perusal of one of these volumes, which has been conscientiously maintained for a few years, brings out point after point of medical history, some of which are of profound importance in the management of the individual from a physical standpoint. How often, for example, is a family history of hemophilia entirely overlooked, and the newly born child lost, or put in peril of its life by an immediate circumcision or by hemorrhage from the cord, when appropriate treatment administered during the latter half of gestation might have entirely prevented such calamity? Similar instances could be cited to an indefinite number.

First, then, a more careful investigation as to the probability of transmitted abnormalities. Second, more careful study of the obstetric patient from the standpoint of the child. It is routine practice to examine the mother for evidence of organic disease, to determine her pelvic size and contour, to investigate the character of the urine, the blood pressure and the like, but it is unusual for periodic examination of the fetus to be made with regard to the uni-

formity of growth, the nature of its movements, evidence of faulty circulation, or of interference with nutrition from any cause.

Fetal disease is often associated with pain or discomfort on the part of the mother, and investigation of such condition should be made with a view to the possible diagnosis of the cause of the symptoms, not only with reference to the mother, but also to the child.

The diagnosis of antenatal disease is still almost virgin ground, the more so by reason of the dearth of detailed observations of the pregnant woman who eventually gives birth to a diseased infant. Certain physical signs have been orientated, however, and from a nucleus which may develop into a considerable group of diagnostic facts.

Hydramnion, for example, may be diagnosticated, and is known to be very frequently associated with monstrous infants or with twins.

It is known that weak, irregular and arrhythmic fetal heart sounds may be present in the case of anencephalic or other monsters in which the cerebral and spinal centers are so ill developed that this regulating action of the heart muscle is lost.

A positive Wassermann reaction in a pregnant woman will prove beyond question that her child will be infected with syphilis.

The fetal size and state of nutrition may be estimated, the vigor and character of the fetal movements have been found to hold certain significance, and in fact the physical signs leading to a diagnosis of fetal disease, if marshaled in order, already form a respectable group, and with a quickening interest in antenatal diagnosis, must grow to become an important factor in obstetric work.

Lastly, the matter of antenatal therapeutics, and here, unfortunately, there is but little to be said. General hygiene of the mother, to produce a well-nourished infant, protection from trauma and infections, a guarding against ovular infection by physical examination of the man contemplating matrimony, are preventive measures long practised and found efficacious.

Salvarsan and mercury in the case of the pregnant syphilitic, calcium salts and blood serum in the gravida who bears a history of hemophilia, and such general therapeutic schemes make up the sum of our knowledge.

The future offers hope, however, and it seems to me beyond question true that more careful study of the pregnant woman from the standpoint of the child, her treatment and observation, not only as an out-patient, but in hospitals, whenever there is any reason to suspect any fetal difficulty, and a collection of detailed data upon the course of all pregnancies which differ in any way from the normal,

and their results as regards the infant will, enable us to shortly have many more facts at our command, and that by the application of our knowledge of the results of abnormal pregnancies to the causes of fetal disease the whole subject of antenatal pathology will attain to a state of workable scientific information, giving to medicine another unit of power for the betterment of our race and species.

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## HYDATIDIFORM MOLE.

AN ANALYSIS OF 500 CASES.

BY

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THE purpose of my paper is to present a clinical analysis of 500 cases of hydatid mole found in the literature, and in my personal records. These cases include the 210 recorded in my inaugural thesis before the American Gynecological Society in 1903.

It will be observed that more cases have been recorded in the past decade than in the previous fourteen centuries. This is so because of the interest awakened in the malignant changes of chorionic structures and in cystic ovaries as possible etiologic factors in the development of hydatid mole.

From the time of Aetius von Ameda of the Sixth Century the etiology of hydatid mole has been a subject of much speculation.

We are told by Christoph á Vega that hydatid mole is the product of the union of the maternal humor with the male semen in the womb; by Valleriola that the mole originates from the ovum which failed of impregnation because of the escape of the male germ; by Percy that the vesicles of the mole are animals; by Sowin that hydatid mole is the product of unimpregnated ova, and by Goeze that they are of parasitic origin. Not until the beginning of the nineteenth century was hydatid mole generally recognized as a degeneration of chorionic villi. Marchand advanced the theory of fetal origin and Van der Hoeven of uterine origin. Virchow suggested the causal relationship of endometritis and a little later Fränkel, Runge, Kaltenbach, Kreutzmann, Marchand, and Baumgart endeavored to establish a causal relationship between cystic ovaries and cystic degeneration of chorionic villi. It was observed by Stoekel in 1901 that many cysts of the ovary associated with hydatid mole were lutein in origin. He further observed that

lutein cells were diffused throughout the stroma of the ovary. Then Fränkel came forward with the theory that interference with the function of the corpus luteum is a cause for hydatid mole, chorioepithelioma, and death of the fetus. And Pick advanced the theory that excessive secretion of the corpus luteum may account for the development of chorioepithelioma. Dunger would have it that the cysts of the ovary are secondary to the development of chorioepithelioma and are analogous to hypertrophy of the heart and other nutritional changes incident to pregnancy. It is of interest to note that occasionally cystic ovaries become greatly reduced in size following the delivery of a mole.

Ewing dwells at length upon the evident hypertrophy of lutein cells within the cyst wall and scattered throughout the stroma of the ovary. He comments upon the finding of multiple ovarian cysts in cases of hydatid cysts and chorioepithelioma (90 per cent. of all cases), and concludes his theoretical discussion with the assertion that excess, deficiency or alteration in quality of the ovarian secretion may result in the development of hydatid mole and chorioepithelioma.

While these interesting observations are far from conclusive they do convey the impression that there is a definite, though as yet vaguely understood, relationship between the functional activities of the ovaries and the development of hydatid mole and chorioepithelioma. In my 500 cases cystic ovaries were noted in fifty-eight, and in four instances retrogressive changes in the ovaries were observed to follow upon the expulsion of the mole.

We are forced to the conclusion that of the etiology of hydatid mole and chorioepithelioma we know nothing.

We have no way of accurately estimating the frequency of hydatid mole. Krönig finds one mole to 728 pregnancies, and Williamson one to 2400 pregnancies; Essen-Möller three per thousand. It is fair to conclude with Veit, Freund, and Dunger that abortive types of hydatid mole are commonly overlooked. Small isolated vesicles in an otherwise normal placenta I have occasionally observed and believe them to be not infrequent.

In the 500 cases collected from personal records and the literature the respective ages of the individuals at the time of the delivery of the mole were as follows:

13 years.....	2
14 years.....	1
15 to 25 years.....	111
25 to 35 years.....	143
35 to 45 years.....	84
45 to 50 years.....	36
50 to 55 years.....	17

It is apparent that there is nothing significant in age.

Of the 500 moles 131 developed chorioepithelioma at the following ages:

15 to 25 years.....	28
25 to 35 years.....	39
35 to 45 years.....	38
45 to 50 years.....	14
50 to 55 years.....	12

In the 500 cases there were: Twin pregnancies in five. Repeated molar pregnancies in seven. Normal pregnancies following moles in twenty-five. Partial moles with fetus in three. Partial mole with living normal child in three.

Repeated molar pregnancy has occurred from two to eighteen times. The birth of one or more moles does not preclude subsequent normal pregnancies.

The birth of moles occurs with about equal frequency in the second and third trimesters of pregnancy and has been known to occur as late as the seventeenth month of gestation.

The macroscopic and microscopic characteristics of hydatid mole are well recognized, and have been fully described in many excellent contributions. In the American and English literature I would especially refer to the contributions of Ewing(1), Teacher(2), and Caturani(3).

We are all familiar with the observations of Marchand, who finds no criteria of malignancy in the histologic structures of hydatid mole and in this view most of the later observers, notably Hitchmann and Christofolette, concur. Furthermore, it may be affirmed that there is great variation in the degree of malignancy in moles and that we have no certain way of determining the degree of malignancy other than by clinical observations.

Chorioepithelioma malignum developed in 157 cases or 31.4 per cent. of the 500 cases of mole formation. Just what proportion of hydatid moles undergo malignant changes is impossible to determine because ordinary benign moles are not generally reported while those which undergo malignant changes are reported with greater frequency.

It is recognized clinically by Thompson, Stewart, Veit, and others, that chorioepithelioma arising from hydatid mole displays less malignant tendencies than from ordinary pregnancy. Combining the statistics of Lockhart and Teacher we find the recovery rate of chorioepithelioma following hydatid mole 47.1 per cent., abortion 35.7 per cent., and full-term normal pregnancy 33.04 per cent.

In the 500 cases of mole we find that of the 265 benign moles there were recoveries in 237 and deaths in 28; a mortality of 10.5 per cent., while of 99 moles, which later became malignant, there were 45 recoveries and 54 deaths, a mortality of 54.5 per cent.

Ewing has endeavored to point out certain histologic characteristics indicative of malignancy, as has also Velitz, who regards wandering cells as evidence of degeneration and therefore of favorable import, and Schmauch, who finds in the presence of large numbers of Langhans' cells in the intermuscular spaces a criteria of malignancy. Noccioli regards atypical proliferation of the chorionic epithelium as evidence *per se* of malignancy, believing the proliferation to be due to lowered resistance of the part of the uterine tissue. All agree that the destructive type of hydatid mole is not necessarily malignant.

While it is not possible to make a diagnosis of hydatid mole without seeing the vesicles, the accompanying symptoms are highly suggestive. In perhaps 80 per cent. of the cases bleeding is manifest in the first trimester. The loss of blood may be continuous or intermittent, profuse or scanty, and not uncommonly results in marked anemia. It is the opinion of Essen-Möller that the early appearance of hemorrhage portends mola destruens or chorioepithelioma. More suggestive than bleeding is a mucosanguineous discharge. Such a discharge is an almost constant feature.

In most instances the uterus is relatively large for the time of pregnancy; in a small number it is found to be smaller or of the usual size.

In the hemorrhages, mucosanguineous discharges and alterations in the size of the uterus, we have the most important clinical suggestions.

Pain is an occasional accompaniment and is ascribed to the rapid increase in size of the uterus. Vomiting is present in 15-50 per cent. of cases (Essen-Möller) and may be uncontrollable. Here as in pregnancy in general it is ascribed to toxemia. Albuminuria is said to occur earlier in molar pregnancy than in normal pregnancy. Its frequency is variously estimated at 10-60 per cent. Again in

the few cases in which eclampsia has occurred the convulsions appeared early in pregnancy.

In my series of 500 cases many of the records were woefully deficient as to symptoms. The following symptoms are tabulated:

Bleeding in.... 290 (66 per cent.)	Dyspnea in ..... 5
Pain in..... 42 (9.5 per cent.)	Hemaphys in.... 3
Albuminuria in.. 13 (38 per cent.)	Toxemia in..... 1
Vomiting in.... 60 (13.5 per cent.)	Headache in..... 5
Fever in	Eclampsia in..... 9

A positive diagnosis can only be made when cysts are seen and hence it follows that the diagnosis is seldom made prior to the time of delivery; too late to be of value in the making of an early diagnosis. Of prime importance in awakening a suspicion of the presence of a molar pregnancy is a more or less continuous mucosanguineous discharge associated with a disproportionate increase in the size of the uterus.

The prognosis of hydatid mole is uncertain and must remain so for many years after the mole is discharged. This is so because of the immediate dangers from sepsis, hemorrhage, and perforation of the uterus, and the remote dangers of malignant changes. Hirst would keep these patients under observation at least three years for fear of the development of malignant changes. Hemorrhage may be so great as to threaten life; albuminuria and vomiting from toxemia may prove disastrous. Rarely a destructive mole may prove fatal from perforation of the uterus. From a prognostic standpoint the greatest interest centers in the question of malignancy. Authorities variously estimate the percentage of moles which undergo malignant changes at from 1 to 64 per cent. In sixteen cases reported by Essen-Möller, four were malignant, a percentage of 25.

In 290 of our series of hydatid moles 156 (57 per cent.) were not followed by malignant changes and 124 (43 per cent.) developed malignant changes. Of this number there were:

Vaginal metastases in.....	25
Pulmonary metastases in.....	21
Cerebral metastases in.....	4

Of benign moles 87 recovered and 11 died, and of the 99 malignant moles 43 recovered and 46 died.

As to prophylaxis in hydatid mole nothing can be said.

Frank has well said that "no other growth requires greater caution in risking a prognosis; no other growth will offer greater difficulty in deciding upon a safe but not overradical treatment."

In earlier years the expectant plan of treatment was generally practised for fear of hemorrhage, sepsis, perforation of the uterus, and the possibility of not removing the mole *en toto*. Tentative measures have given way to more radical procedures because of the better understanding of the dangers of delay, particularly in relation to malignant changes.

Inasmuch as but a small percentage of cases will be completely delivered spontaneously it is wise to follow the expulsion of the mole by passing a curet lightly over the decidual surface.

In general the management of molar pregnancy is that of inevitable and incomplete abortion. When the hemorrhage is protracted and before it becomes excessive the cervix should be dilated and the mole removed by fingers or instruments.

The suggestion of Vineberg to perform vaginal Cesarean section for the delivery of moles in selected cases is a happy one.

The greatest caution should be exercised in all operative procedures for fear of hemorrhage, sepsis, and perforation. Essen-Möller recommends hysterectomy where the hemorrhages are excessive and the cervix firm.

This is rather radical advice. In my judgment a Voorhees bag or Dührssen's incision of the cervix would accomplish the desired results with less sacrifice.

Howard Taylor reasons well in favor of hysterectomy in mole formation when occurring near the menopause, and in women who possess the desired number of children. He quotes the statistics of 16 per cent. of moles undergoing malignant changes and argues that but a small number recover after malignancy develops. In this opinion Vineberg concurs.

In 386 cases there was spontaneous delivery in 167 (43.2 per cent.) and operative delivery in 219. Of the operative deliveries 9 were induced by bougies, 1 by tampons, 1 by a hydrostatic bag and in 105 the method was not stated. Hysterectomy was performed in 20; Cesarean section in 2, and vaginal hysterectomy in 3. The remaining operated cases were digital and instrumental removal of the ovum following natural or instrumental dilatation of the cervix.

Where uterine bleeding follows the delivery of a mole in subsequent weeks, months or years, it becomes imperative to curet the uterus and examine the scrapings. If proliferating syncytial tissue is found, hysterectomy must be performed.

Where a metastatic growth is found to contain chorionic tissue, it is my opinion that it is hazardous to speculate upon the benignancy or malignancy of the growth, but rather to assume that not only the



metastatic growth is malignant, but that the uterus is probably the seat of a primary growth even though a thorough curettage does not disclose the presence of chorionic tissue. We are to bear in mind that the endometrium may be free, and the deeper lying structures the seat of a malignant growth. It follows that in all such cases a radical hysterectomy and removal of the metastatic growth should be performed. I agree with Caturani that "all forms of chorionic tumors ought to be treated according to the general criteria adopted for malignant tumors."

CASE REPORT.—Mrs. A., aged twenty-four, primipara, had menstruated regularly until four months before admission to the Birch-Knoll Maternity of Omaha. For a period of eight days before admission she had a continuous serosanguinous vaginal discharge. The uterus was tense in consistency and reached to the level of the umbilicus. The diagnosis of hydatid mole was not made with certainty until the delivery of the mole by means of a hydrostatic bag. The placenta was completely degenerated and no fetus was in evidence.

Convalescence was uninterrupted and the patient discharged on the fourteenth day with the instructions that she should return in event of bleeding from the uterus.

Three months later she returned because of a slight bloody vaginal discharge. On examination a nodule the size of an almond was found in the posterior wall of the vagina, which was firm and dark blue in color. This was excised and found to contain proliferating syncytial cells, no Langhan's cells or villi. The uterus was subinvolved and both ovaries cystic and the size of an orange.

A complete hysterectomy was performed removing the entire uterus, tubes and both cystic ovaries. The uterus contained no chorionic tissue. This was sixteen months ago and there has been no evidence of recurrence.

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670 BRANDEIS THEATRE BUILDING.

## THE TREATMENT OF SEPTIC INCOMPLETE ABORTION\*

BY

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THE method of procedure in incomplete abortion, with or without fever, had been pretty well established until 1911, when there appeared the rather startling paper by Winter of Koenigsberg. This author became dissatisfied with the results of active treatment of septic abortions in his "Klinik" and instituted an investigation of the preceding 100 cases. This revealed that, of these, there were thirteen deaths from infection, four cases of pyemia, not fatal, one case of peritonitis, also not fatal, eighteen cases of parametritis and ten cases of endometritis. These results, he says, surprised even himself, but on looking up the literature, he stated that he found that they corresponded to that in other "Kliniks," that is, Schottmueller reported a mortality of 10 per cent. and Stock a mortality of 23 per cent. in the Berlin "Klinik." Winter holds, the prognosis is dependent upon the variety of organism found. For instance, in ten cases with the streptococci not differentiated, there were four deaths and two severe infections. In twenty cases with hemolytic streptococcus, there were six deaths and four severe infections. In twenty-four cases with staphylococcus, there was but one death and two severely ill. In ten cases with bacteria coli, there were no deaths and but one severely ill. On the basis of these findings and further study, Winter arrived at the conclusion that every case of abortion, manifesting fever, should have the uterine discharge bacteriologically examined and, if streptococcus of the hemolytic variety were found, the case should be treated upon the expectant plan, until the temperature fell to normal and then the uterus could be emptied of its contents. The only exception he would make would be the presence of alarming hemorrhage. Winter's position in the profession is such that any statement of his, could not fail to excite world-wide attention.

Immediately after the publication of his paper, almost every "Klinik" in Germany analyzed its records of cases of abortion and almost every Gynecological and Obstetrical Society discussed the subject at great length. We have, within the past few weeks, reread

\*Read Before the New York Obstetrical Society Jan., 1917.

the various publications and discussions and, again, felt surprise at the little support Winter's axiom found, in the other German "Kliniks."

We will quote only from a few of the more prominent authors and "Kliniks," in illustration. Haberle(1) analyzed the results of active therapy in the Würzburg "Klinik," for the preceding twenty years. The number of infected cases was ninety-eight, divided into two groups, one group comprising the cases with temperature above  $102^{\circ}$ , the second group, with temperature between  $100^{\circ}$  and  $102^{\circ}$ , or without fever, but with fetid and decomposing products. In the first group there were thirty cases, several of which showed signs of a very severe infection; of these there were two deaths, one due to sepsis and one to peritonitis. Complications after emptying the uterus occurred only once, a mild thrombophlebitis. In the second group, there were sixty-eight cases, seven of which had no fever but had a fetid discharge, of these there were three deaths, one due to peritonitis and two to pyemia. In thirty-one cases the fever fell to the normal after emptying the uterus. Of the five deaths, two, in all probability, the author states, could not be ascribed to the active therapy. On the strength of these results, he advocates active treatment in infected abortions.

Schottmueller(2) analyzed 145 cases of septic abortions, chiefly from a bacteriological standpoint; but of this, later. He is a strong advocate of active therapy, the uterus should be emptied, he states, as soon as fever appears. The mortality is always high (10 per cent.), because the women, often through fear or shame, do not consult a physician until it is too late.

Frommel(3) is strongly opposed to Winter's method and is of the opinion that the mortality would be much higher if it were adopted. He does not look upon the transmission of hemolytic streptococcus into the blood, of such serious moment as Winter would lead us to believe. He affirms that the frequent positive findings in the blood in cases of decomposed placental remains, argue strongly in favor of immediate active treatment.

Warnekros(4) on the basis of analysis of eighty cases of septic abortions in Bumm's "Klinik," in which extensive bacteriological examinations were made, arrives at the direct opposite conclusion from that of Winter. He states, that the presence of hemolytic streptococcus or other pathogenic organisms, demand the most prompt emptying of the uterus, inasmuch as the body is deluged with the most virulent bacteria and a rapid paralysis of the resistant powers of the system is to be expected, if the source of the infection be not immediately

removed. He concludes his paper with the following paragraph, translated *verbatim*: "Not the microscope should furnish us with the indication for the therapy, but the objective findings. If we find that the uterus has still not been emptied, it should be emptied at once. If the general condition of the patient and the examination of her make us suspect that a more extensive infection has taken place and that there is a tendency to localization, we must, at least, make the effort to save her life by a more radical interference, such as extirpation of the uterus, ligation of the pelvic veins or drainage."

But, while Winter's teachings met with but slight response in his own country, and his theories there have been generally discarded, we, in this country, have recently begun to feel its influence. It occurred to us, therefore, that the subject might prove to be one of interest to present to this Society. Of late, there seems to have been, in this vicinity, a strong tendency to be guided by Winter's proposition. Now, the entire structure of Winter's attitude is built upon the foundation of the value to be attached to the presence of the hemolytic variety of streptococcus. To the present writers this seems very unsafe ground to build upon. One of us has always maintained that, up to the present, a bacteriological examination of the uterine discharge, or of the blood, furnishes us with no reliable criteria, as to prognosis or as to indications for treatment in post-abortive or postpartum sepsis (H. N. V.). That, while such an examination is advisable for scientific interest, we, nevertheless, are forced to base our treatment upon clinical data alone. We were, consequently, very much gratified and strengthened in our conviction, on rereading the literature upon the subject, to find that in Germany, the stronghold of bacteriology, little or no value, as a rule, is attached to the bacteriological findings in septic abortions. We have already seen what value is attached to them in Bumm's "Klinik."

Let us hear what Schottmueller(2) than whom, there is no greater authority upon the subject, has to say. He analyzed 145 cases bacteriologically. He discards the common division into sapremic and septic cases, as every form of bacteria may be found in the blood, even the bacteria coli may cause a grave or fatal infection. Regarding the therapy, he says, no attention should be paid to the variety of bacteria found, but the uterus should be emptied as soon as fever appears, so that a transmission of the germs into the tubes or veins be avoided, thereby.

Frommel(6) in a discussion in the Berlin Gynecological Society, laid emphasis upon the fact that in febrile abortions, other varieties

than the hemolytic streptococcus were the cause of the sepsis. He stated that the value of the bacteriological examination of the uterine discharge or of the blood, so long as the uterus still contains any products of gestation, is *nil*. It is different, he says, when the uterus is empty, or has been emptied, and with the fever still persisting. The presence of bacteria in the blood, in these conditions, he considers as of grave prognosis. Several other observers could be quoted to the same effect.

The treatment of febrile incomplete abortions, on the second Gynecological Service of Mt. Sinai Hospital, to which we are attached, has always consisted in emptying the uterus as early as possible. As we laid no stress upon the value of bacteriological examination in these cases, it was only in especial instances that such an examination was made. We were convinced that this was the most logical procedure, and were under the impression that the results were good. In order to determine whether this impression had full justification, one of us (S. W.) carefully analyzed the cases in the service, for the five years preceding Jan. 1, 1916.

During this period, there were 287 cases of either incomplete or inevitable abortions, of these there were sixty cases which had temperature ranging from  $101^{\circ}$  to  $105^{\circ}$ , many of which had admitted to instrumental interference, either by themselves, midwives, or doctors and we are safe in the assumption that all had been tampered with. During the long term of service in a large dispensary class, one of us made the observation that a spontaneous miscarriage is never attended with febrile manifestations (H. N. V.). There is one exception to this rule and that is, when the uterus lies in retroversion or retroflexion. The inability of the uterus to drain, in these conditions, not infrequently, gives rise to some temperature. All of the sixty cases had been curetted, or the uterine contents removed by other means, as promptly as it was feasible after their admission into the hospital. In the majority of the cases emptying of the uterus was done by the house surgeon, or his senior. Of the methods used we will speak later. In the entire series there were but two deaths. One died nine hours after the curettage with symptoms of pulmonary embolism. The other died of septic pneumonia, nine days after the curettage. The then incumbent house surgeon performed the operation and perforated the uterus. During the next few days, the temperature ranged from  $101^{\circ}$  to  $103^{\circ}$  and death occurred on the ninth day, with symptoms of pelvic peritonitis and septic pneumonia.

In a third case, in which the temperature was  $104^{\circ}$  and pulse  $120^{\circ}$  for several days after the curettage, there developed a swelling in the

subscapular region, which on aspiration showed pus. The patient refused to have this incised and left the hospital against advice. Apart from this there were no complications, such as exudates, parametritis, or salpingitis.

In two cases, the curettage was followed by a chill and temperature of  $105.6^{\circ}$  and  $106.6^{\circ}$ , respectively. In both, the temperature fell to normal in twenty-four hours.

The majority of cases were not subjected, as already stated, to a bacteriological examination, either of the uterine discharge or of the blood.

In one case the patient confessed to having introduced several alum sticks into the uterus, to bring on a miscarriage, three days before admission. She had a severe chill and fever. On admission, the temperature was  $102.4^{\circ}$ , pulse 96. Cultures from the uterine cavity and from the blood showed streptococci pyogenes and colon bacilli. Following the curettage, the temperature ranged from  $100^{\circ}$  to  $103^{\circ}$  for seven days and then became normal. She was discharged a week later, apparently perfectly well.

In not a few cases the temperature persisted for a longer period than two days. Then a second curettage would be done, by one of the attending staff and considerable amount of residual tissue be removed. The temperature would then rapidly decrease to the normal. In a few other cases, again, fever would recur some days after the curettage, this would be due to retention of the lochial discharge and would disappear on simple dilatation of the cervix and an intrauterine irrigation.

We wish to draw especial attention to the exceedingly low mortality, merely 3 per cent. When one considers that the records cover a period of five years and comprise a great number of severely infected cases, the morbidity and mortality are surprisingly low.

In view of this experience, we see no reason for changing our method of treatment. On the contrary, we see in it a very strong confirmation of the value of active therapy.

Now the question arises, what means should be taken to remove the uterine contents. Let us say, at once, we never think of using uterine gauze packing to dilate the cervix.

When the period of gestation is less than eight or ten weeks, we employ branch dilators to dilate the cervix and usually, use the placental forceps to remove the uterine contents, supplemented with the sharp curet to scrape away any tissue adherent to the uterine wall. We have no fear of the sharp instrument, our own conviction being that less traumatism is likely to be inflicted with a sharp curet,

used with a light hand, than with a dull instrument that has to be vigorously applied.

In cases more advanced than eight or ten weeks, we usually make use of vaginal hysterotomy and then we have no difficulty in removing the uterine contents with the fingers, aided at times, by the placental forceps.

After having removed all the ovular products, we were, formerly, in the habit of irrigating the uterine cavity with 50 per cent. alcohol, latterly we have substituted a tincture of iodine solution having the color of red wine. We have not for a number of years, inserted any gauze into the uterus after emptying it, and since we have given up doing that, we have found that the postoperative temperature has been much less frequent. We sometimes place a piece of gauze against the cervix, if it has a tendency to bleed freely from the bites of the volsellum. This is removed within twelve or twenty-four hours and followed by a vaginal douche. The douche is not repeated, unless specially indicated.

In the preparation for the curettage, we lay great stress upon shaving the entire vulva and scrubbing it thoroughly with soap and water. In our opinion, this is very much more important than scrubbing the vaginal canal.

What would we do in the presence of an exudate, a peri- or parametritis, or salpingitis? Fortunately, we are very rarely confronted with this question. Our hospital records do not show a single instance of such a complication. This, of course, does not say that this complication, in a minor degree, was not present in some of the cases. In the presence of an undoubted complication of this kind, we would proceed very cautiously, unless we were certain that there was a large amount of tissue still in the uterus, we would be inclined to treat the case upon the expectant plan and any interference would be carried out with the greatest gentleness.

In conclusion, we would say, that in our opinion, one of the most important features, in the class of cases under consideration, is to determine, if possible in each case, in advance, whether the uterus still contains any tissue, before instituting active interference.

In the majority, and we may say, in all cases of abortion with fever, there has already been some tampering and in many of them, the uterus has already been curetted. No good, but harm can be done by subjecting any empty, septic uterus to any active instrumentation.

We have reason to believe that our very low mortality and morbidity were, in a great measure, due to the care we took regarding

this point. No case was ever subjected to active treatment until it was first seen by one of the attending staff and the indication made by him.

751 MADISON AVENUE.

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SOME OBSERVATIONS ON NITROUS OXIDE  
GAS AS AN ANALGESIC IN LABOR, WITH  
REPORT OF 135 CASES.\*

BY

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UNTIL within a few years, it has been customary for the obstetrician, during the confinement of his patient, to do all in his power for her safety and that of her child, but to do little for the relief of pain, till the anesthetic at the very end of labor. "All women have to suffer in childbirth," he said. Several years ago, a Sister of Charity in a maternity hospital protested against the use of chloroform in the confinement of patients, on the ground that the Bible says, "With pain and sorrow must woman bring forth her babe into the world."

This attitude is passing, and attention is now paid to the comfort of the patient as well as to her safety.

There is no doubt that the country-wide agitation over "Twilight Sleep" of a year ago, is largely responsible for this change. To this extent, at least, the world may be grateful to the supporters of "Twilight Sleep." It is not germane to the subject to discuss the merits and demerits of this remedy. Suffice it to say that in the opinion of many obstetricians, one of the great objections to it is the supposed danger to the fetus. It was natural, therefore, that in looking for a safer means of relieving the suffering in childbirth, the profession should have turned to the use of nitrous oxide gas, which had been tried successfully, but had not remained in general use in New York. In the West it has been used much more extensively.

\* Read at a Meeting of the New York Obstetrical Society, February, 1917.



Indeed, it was at the earnest request of a western obstetrician that I promised to report my series of cases.

This series of 135 labor cases to whom nitrous oxide gas was given, consists of four groups. The first, in August, 1915, is composed of fifteen cases in the free wards of the Sloane Hospital. Nitrous oxide gas was given to these patients during their severe pains by a doctor who came to the hospital seeking instruction in obstetrics. In return for his giving the gas, under our direction, he was allowed to live in the hospital, and to see all of the obstetric proceedings occurring during his two weeks' residence. The second group consists of ward cases also, eighty-seven in number, to whom nitrous oxide gas was given in August, 1916. This gas was given by two nurses, specially employed, one for the day and one for the night. Every woman suffering in labor, during the month, was so far as possible, given relief by means of the gas. The third and fourth groups receiving gas during labor consist of thirty-three private patients, at the Sloane and outside of the hospital, fifteen and eighteen each. The total series consists, therefore, of 102 ward patients and thirty-three private patients, 135 in all.

The results for each group, summarized and compared, varied but slightly, so they may be compared together. The slight differences will be commented on later.

The gas was given with the apparatus shown. This consists first of an inhaler from the S. S. White Dental Co. This fits over the nose and mouth of the patient, and has two valves, an inlet for the gas and an outlet for the expired air. With this apparatus, rebreathing is not possible. Above there is a cap worked by a spring, and so constructed, that only when the spring is pressed down, can the patient receive the gas. Thus, if desired, the patient can administer the gas to herself. Just before the pain starts, she places the mask over her face, and presses down the spring. When she gets sufficient gas, her grasp relaxes, she releases the spring or drops the mask, and henceforth gets nothing but air. Thus, it is difficult for her to get too much gas. The danger sign, moreover, beginning cyanosis can readily be seen by the doctor or nurse, and the gas can be stopped by releasing the spring, or lifting the mask. The patient was always watched closely while breathing the gas.

For some of the patients, a second mask was used, so constructed that rebreathing was possible. This is more economical of the gas, but has the disadvantage that the patient cannot administer the gas to herself. In many cases this self-administration of gas has an excellent psychological effect on the patient.

Often, however, the gas was administered by the anesthetist, without the help of the patient. The mask connects with a tube entering a large rubber bag. This in turn connects with the cylinder of nitrous oxide. The bag is filled between pains, and the patient breathes in the gas only just before and during the pains.

Except for one or two of the private patients, no oxygen was used on any of this series of patients. This was for the sake of simplicity, the necessary oxygen being easily obtained from the air.

The gas was given to each patient as soon as she desired it. This usually happened well along in the first stage, the early first stage pains not generally giving enough distress to cause the patient to ask for relief. The gas was then given almost to the end, through the second stage, till the head was well down on the perineum, when ether by the drop method was substituted. The labor was actually finished under ether. In none of the cases was chloroform used. It will readily be seen, that in long drawn-out labors, with partial inertia, very little gas would be asked for. Again, in very short labors, or where the patient was only seen late, there was time for but little gas to be given.

In this series of 135 cases, considered together, there were seventy-five primigravidæ and sixty multigravidæ. At the time of labor 128 were at term, seven were premature. The average duration of labor was sixteen hours and eight minutes. The average duration of the second stage was one hour and twenty-seven minutes. The average length of time of giving the gas to a patient was one hour and twenty-seven minutes. The longest time was eleven hours and forty minutes, the shortest time five minutes.

In thirteen, the gas was given entirely in the first stage; in fifty-five in the first and second stages together; and in fifty-nine only in the second stage. (In eight the records were not definite.)

Ether, at the end of the second stage, was given on an average for seven and one-half minutes.

The average weight of the babies born was 7.1 pounds.

Asphyxia at birth was noted in only six out of the 135. As ether was used in all cases, and forceps in many, there is no indication that any of these were due to the gas.

There was no irregularity of the fetal heart in any of the cases observed.

There were two stillbirths, and two infant deaths in the series, a total infant mortality of four in 135, or 2.9 per cent. In 20,000 consecutive labors at the Sloane Hospital, the fetal mortality, stillbirths and infant deaths, is 11.4 per cent., far in excess of this mortality. It is doubtful if any of this mortality can be laid to the use of the gas. Neither of the stillbirths can. In one, the fetus was dead before labor began, as evidenced by lack of fetal heart sounds and maceration at birth; in the other, the mother was markedly toxic with albuminuria. Of the deaths, one fetus was born prematurely at seven months and lived fourteen hours. The other died at the end of the second week from cerebral hemorrhage.

It seems fair to conclude that none of the fetal deaths was due to the gas. And the fetal mortality is only a fourth of that of the hospital in general.

The results to the mother were as follows:

Relief from pain, marked or slight, was given in all but four of the cases. This was observed as "marked" in seventy-two, "slight" in fifty-nine and none in four. The uterine contractions, observation seemed to show, were for the most part not affected or increased in strength. However, in some cases they were plainly decreased.

Thus, they were observed as not affected in fifty-two, increased in fifty-seven, and diminished in twenty-six.

The loss of blood, immediately following labor, was observed to be less in this series of cases than in the usual run of cases at the Sloane.

It is the custom at the Sloane, in compiling records, to consider a loss of blood of 16 ounces or more, as a postpartum hemorrhage. Any loss, less than 16 ounces, is not considered a hemorrhage. On this basis, the percentage of postpartum hemorrhages in 20,000 labors is found to be 10.5 per cent. In the series of 135 gas cases, there were ten hemorrhages of 16 ounces or over, a percentage of 7.4 per cent. The average amount of hemorrhage, for the series, was 7 ounces per patient.

Delivery was accomplished normally in 103 cases, by breech in three, and by forceps in twenty-nine. This makes the percentage of forceps deliveries 21.4 per cent. This percentage was exactly the same, among the ward and among the private patients. In 20,000 deliveries at the Sloane Hospital, the percentage of forceps deliveries was only 12.3 per cent. Hence the percentage of forceps operations in the gas series is much above the average.

The average length of labor was sixteen hours and eight minutes. In 5000 normally conducted labors at the Sloane, half primigravidæ and half multigravidæ, it was found that the average length of labor—for primigravidæ was fifteen hours and thirty-one minutes, and for multigravidæ eleven hours and thirty minutes. The average length of labor for this gas series was, therefore, greater than the hospital average, even for primigravidæ, by thirty-seven minutes.

The cost of the gas, exclusive of the price of the apparatus and the services of the nurses, averaged about 43 cents a patient.

The results obtained in the free wards, and those obtained among the private patients, were slightly different.

The average duration of labor was much greater among the ward patients than among the private patients. For the ward patients, it was eighteen hours and thirty-four minutes, for the private patients only seven hours and fifty-nine minutes.

This was partly due to the higher percentage of primigravidæ among the ward patients.

All of the ten postpartum hemorrhages occurred among the ward patients. There were none among the private patients.

(The high percentage of forceps operations twenty-one was the same in ward as in private patients.)

Among the private patients, the gas was given oftenest during the first and second stages. Among the ward patients, it was given oftenest during the second stage only. Possibly this shows that the private patients sought relief from pain earlier, or simply that their early contractions were more severe, as shown by their shorter labors.

The average time the gas was given was about the same, an hour and a third and an hour and a half respectively, for private and ward patient.

Marked relief from pain was more frequent among the private patients than among the ward patients. Among the private patients, 74 per cent. seemed to get "marked" relief, while only 46 per cent. received "marked" relief among the patients of the ward. However, *some* relief "marked" or "slight" was obtained in about equal proportions, in private and ward patients, 97 per cent. and 96 per cent., respectively.

The effect on uterine contractions was about the same in the two classes of patients. The contractions were either made stronger or not changed at all, among the private patients in 85 per cent., and among the ward patients in 81 per cent.

There were no fetal deaths among the private patients. Those that occurred were among the patients of the ward. However, none of these seemed to be due to the use of the gas.

In general, it may be said that patients of greater intelligence showed better results than did those of lesser intelligence. Not only did they seem to appreciate the gas more, but they expressed their approval much more freely.

Indeed, some of these expressions of approval were very striking. I cannot refrain from mentioning a few.

The very first private patient of the series was a most nervous woman. She was in her first pregnancy, and was constantly complaining of slight symptoms, and was frequently thrown into panic over trivialities.

She arrived at the hospital, in the first stage of labor, in a high state of hysterical excitement, screaming and crying and throwing herself about. Gas was given to her immediately, the patient administering it to herself. At once she became calm, and when I saw her a half hour later, she said, "Why, doctor, I don't mind these pains at all, with the gas. Do women ever have to go through labor, without it?" The gas was given for two hours, when the head was well down on the perineum. Delivery was finished under ether. After the placenta was expelled, part of the chorion was retained, and the uterus was curetted manually under gas alone. A small tear in the perineum was also sewn up under gas. No patient could have been better behaved, than was this high-strung woman, with the gas analgesia. The entire labor was five and one-half hours long and gas was given for two hours and twenty minutes.

Another patient, also with her first child, had a labor of eleven and one-half hours. She was given gas for the last two hours and eighteen minutes. Up to this time, she did not desire it. The gas exhilarated her, and while she was having hard frequent pains, she was giggling and saying, "Why I don't mind having a baby. It's not bad at all. It's really awfully jolly." After the gas was started, she never seemed to suffer a bit. She is at present telling all her friends of the wonders of nitrous oxide gas.

A third patient had had three babies without gas. In her fourth labor, the pains were very irregular and weak, and labor dragged along, with little discomfort, but with increasing impatience on the patient's part to have it over with. After six hours of labor,

examination showed the cervix dilated four fingers, and well thinned out with the membranes intact, over the presenting vertex. One c.c. of pituitary extract was given hypodermatically, and in a few moments hard first-stage pains developed, so hard that the patient cried out for relief. Gas was immediately started. An hour later the patient delivered herself normally. She was most enthusiastic about the gas, and the next day she said, "The gas gave me such wonderful relief, that I would like to give a gas apparatus to the Sloane Hospital, so that the poor women in the wards could have the same relief, in their labors, that I did." It was this patient's money that paid for the nurses and gas given to the patients, in the wards at Sloane, in August, 1916.

It is interesting to note that in the attempt last August to give gas to every suitable case in labor in the hospital wards, out of the 144 cases delivered, eighty-seven or 60 per cent. received the gas. In the 40 per cent. not receiving the gas, either the pains were so weak that the patient did not desire relief, or the labor was so short, or so far advanced on admittance to the hospital, that there was no time for the gas.

Among the private patients, thirty-three out of sixty-nine, or 48 per cent. received the gas. Of the thirty-six who did not receive the gas, in fifteen the labors were too short, and in twenty-one the pains were too weak for the gas to be of use. In other words, taking ward and private patients together, a little over half, 56 per cent., of the cases under observation, were suitable cases for the gas. The others had labors too short, or pains too weak to receive relief from the gas.

#### CONCLUSIONS.

Observation of this series of 135 labor cases treated with nitrous oxide gas, as a means of lessening the suffering incident to labor, has seemed to show:

1. Nitrous oxide gas is a safe analgesic in childbirth. In the series, no ill effects to mother or child could be traced to its use.
2. It is easy of administration. It can be given by the patient herself, under supervision, or by any competent trained nurse, with slight instruction. However, if correctly given, its effect can be greatly enhanced. One or two good breaths of gas should be taken, before the full strength of the pain is felt. Thus partial analgesia will be reached in advance, and little pain will be felt. If one waits till the pain has reached its full strength, before giving the gas, the pain may be half over before analgesia is reached, and little relief may be given.

3. Nitrous oxide gas, when used in labor, gives some relief in nearly all cases, 90 per cent., and in over half of the cases the relief is marked.

4. The gas is not suitable for all patients, only a little over half, but it is especially suitable for those patients who need relief most, namely those with severe pains, of long duration.

5. Nitrous oxide gas does not lessen the force or frequency of the uterine contractions, except in a small percentage of cases. In over 80 per cent. of the cases, during its use, the contractions were either not changed, or actually strengthened. However, it seems that weak, irregular contractions are more apt to be diminished, than stronger, more regular ones. But these weak contractions cause little discomfort, and to not call urgently for relief.

6. The gas gives better results when used on patients of intelligence.

7. The gas is cheap. For the ward patients it averaged only 43 cents a piece. For private patients it will be slightly more.

8. Good results may be obtained without the use of oxygen, though the mixture of the gas with oxygen would probably be an improvement.

9. The use of nitrous oxide gas in labor does not predispose to postpartum hemorrhage.

10. Does the use of gas in obstetrics increase the length of labor? The average length of labor for the series was a little over sixteen hours, as we have seen, while the normal average for the hospital, for primigravidæ alone was only about fifteen and one-half hours. It is well to consider, however, that these 135 labors were not all normal, some were in deformed pelvis, some were in toxic women, and some had to be terminated artificially. Moreover, in some of the long drawn out labors, weak irregular pains persisted for hours without gas, and only at the last, when the pains became severe, was the gas given. Thus the length of labor in these cases was not due to anesthesia. Again, the average length of labor among the private patients, eight hours, was less than the normal average for the hospital, even of multigravidæ, which is eleven and one-half hours.

The conclusion is that, although the average length of labor for this series is above the normal, there is not sufficient proof that it was due to the use of gas.

11. Does the use of gas in labor increase the number of forceps operations? This series would seem to show that it does. The percentage of operations was very high, more than one in five, or 21 per cent. As we have seen, it was the same among the free and among the private patients. Among the former this is undoubtedly very high, as the hospital average for forceps operations, taken from 20,000

consecutive labors, is not much more than half this, 12.3 per cent. For private patients, however, is this percentage of twenty-one, for forceps operations, so high? My own records, for the 369 private patients preceding the use of gas, show a percentage of forceps operations of twenty-eight.

In closing, I would say, from my experience with nitrous oxide in obstetrics, that I believe it to be most useful. It *does* relieve the severe pains of childbirth. It does not destroy them, but it deadens them. It makes many labors bearable, that without the gas would be almost unbearable. It can't be used for every patient, but it can be used for over half of them. When used it practically always gives relief. Very often the relief is wonderful.

And the gas is safe. In all the cases in which I have seen it used, there is not one, in which I could say that it did harm to mother or child.

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## REPORT OF A CASE OF PUERPERAL GANGRENE OF THE LEG.\*

BY

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(With one illustration.)

PUERPERAL gangrene of the extremities is a very rare complication of pregnancy and labor. But it has occurred during the latter months of pregnancy, after full-term labor and after abortions.

Arthur Stein in a recent and excellent résumé of the literature (*Surgery, Gynecology and Obstetrics*, October, 1916) was able to collect four cases of gangrene (three cases lower extremity, one case upper extremity) occurring during pregnancy; sixty-three cases of peripheral gangrene following labor and four cases of gangrene of the extremities following abortion.

Therefore the case herewith reported makes the fifth example in surgical literature of puerperal gangrene following abortion.

A brief résumé of the cases of puerperal gangrene shows its occurrence to be much more frequent in the lower extremity involving one or both feet or legs, less frequent in the upper extremity, and occasionally in the upper and lower extremities combined. In our classification we do not include Raynaud's disease which has no relation to the puerperium except an accidental one, nor do we discuss thromboangiitis obliterans which has recently been investigated by

\* Read before the New York Obstetrical Society, January, 1917.

Willy Meyer and Buerger. We also exclude the gangrene following poisons such as ergot.

*Etiology.*—The causes of puerperal gangrene of the extremities, therefore may be primary and secondary. The primary cause is always *infection* and generally a mixed infection. This infection may manifest itself in different ways:

A. Direct extension by thrombus contiguity through:

1. Placental site, uterine artery, internal and common iliac arteries, ascending into the aorta or descending into the external and femoral arteries, etc.

2. Thrombophlebitis in the broad ligament ascending into iliac veins and inferior vena cava or descending into external iliac and femoral.

There may be a combination of 1 and 2 or extension from the vein to the artery or *vice versa*.

B. Bacteria and toxins in the blood stream affect the intima of the blood-vessels causing endarteritis or phlebitis in distant vessels, causing a thrombus to form.

C. Embolism of material from septic endocarditis or from an infected thrombus somewhere in the body lodges in an artery of sufficient size to cause gangrene of the extremity.

The secondary causes of the gangrene may be:

Hemorrhage, sluggish blood stream and low blood pressure and lowered general resistance.

*Symptoms.*—The onset of the symptoms may be sudden (embolism) or gradual and may occur within a few days after labor or after several weeks have elapsed. Pain generally very severe in the affected extremity is the dominant symptom, generally associated with swelling, followed by redness and gangrene either dry or moist; and the constitutional symptoms of sepsis always accompany the condition and the patient is and looks very sick. The presence or absence of arterial pulse in the affected limb may throw some light upon the location of the thrombus if it be an arterial one although the blood pressure may be so low that the detection of a femoral or popliteal pulse may be difficult. The presence of a thrombophlebitis in the pelvis may give us a clue as to the venous origin of gangrene. The patient may succumb to the septic infection before or after a line of demarcation of the gangrene develops; or the amputation of the affected member, when this is possible, may lead to the patient's recovery.

The outlook is never good and the prognosis depends upon the seriousness of the original infection; second, upon the location of the



thrombus and the possibility of performing amputation above the thrombus.

*Treatment.*—The treatment of puerperal gangrene is essentially prophylactic—*i.e.*, the prevention of puerperal infection. Also in infected patients to stimulate the blood stream by cardiac force, *e.g.*, digitalis, thereby raising the blood pressure; and to give the patient a chance to get well by abstaining from operative procedure, *e.g.*, curettage, which serves to distribute infective thrombi.

The active treatment of peripheral puerperal gangrene consists in rest and elevation of the affected extremity, the preservation of warmth by cotton padding and the administration of opiates for pain and of cardiac stimulants for the general weakness.

As syphilis has not been a factor of importance in the cases so far reported, one cannot hope for much from antisyphilitic treatment in puerperal gangrene.

Where a line of demarcation of the gangrene has been established and where we have reason to believe it possible to operate above the thrombus causing the gangrene, amputation should be performed.

The patient whose history I herewith report was admitted to Gouverneur Hospital October 19, 1915; she was thirty years of age, a Russian, who had two children living, one thirteen years of age, the other seven years of age and had one miscarriage one and one-half years previous to admission.

The patient's menstrual history indicated a pregnancy of seven weeks and her statement to us was that two weeks before entering the hospital she attempted abortion by introducing a hat pin within the uterus and that within a week she began to have chills, fever and sweating, abdominal pain and bleeding from the vagina, although abortion did not occur until two days previous to her admission to the hospital. Patient says she also during this period lost weight and became pale.

Examination upon admission showed a fairly well-nourished woman of average mentality with pallor and slight icterus, cheeks slightly flushed with a marked pinched expression to the face and an anxious look; with a temperature of 106.8° F. a pulse of 140 and respirations 32. Pupils were normal, slight icterus to sclera; teeth good, tongue fairly clean, throat negative. Heart negative, blood pressure, systolic, 70. Lungs and liver negative.

The abdominal examination showed tenderness over the right lower quadrant and to a lesser degree in left iliac region; also slight hypogastric tenderness; there was no rigidity or tympanities.

Vaginal examination revealed a slight fetid discharge from the

uterus; the external os of the cervix admitted one finger. The uterus was slightly enlarged and tender to pressure; considerable tenderness and some resistance in the right vaginal fornix with a small immovable mass involving the right side of uterus, tube, ovary and broad ligament. The left vaginal fornix was free, with no tenderness, no mass. The patients' extremities showed no edema. Urinalysis normal. Leukocytes 30,000, polynuclear 90 per cent.

Smear from cervix uteri showed diplococci and streptococci. Blood culture was sterile after seventy-two hours' incubation; two additional blood cultures taken later at weekly intervals also proved sterile.

Upon the day following admission the patient had a chill lasting fifteen minutes and thereafter during the patient's stay in the hospital



FIG. 1.—Puerperal gangrene of right leg and foot.

chills were frequent varying from one in two days to three and four a day. Upon the third day after admission (or about two and one-half weeks after attempting abortion) patient complained considerably of pain in the right leg and foot although at this time there was no swelling; this pain in the foot became worse, moderate swelling of the foot took place and in four days the toes on the affected foot became dark blue. The swelling of the foot became greater and gradually extended so that the whole extremity became edematous. The entire foot and lower one-fourth of the leg now became reddened and gangrene, first dry, then moist, spread from the toes and involved the entire foot and lower one-fourth of leg and within sixteen days after the onset of the pain in the foot a line of demarcation formed in the

leg. At this time the patient began to vomit coffee ground material, the abdomen became distended and rigid and within a few hours died with a purulent peritonitis, three weeks after admission to the hospital and eighteen days after the onset of pain due to the threatened gangrene.

The patient's temperature during this entire period was very irregular ranging from 97° F. to 106.8° F. and the pulse varied from 80 to 142 and the blood pressure remained subnormal, between 70 to 80. The left lower extremity had only a slight edema.

*Autopsy.*—Body of emaciated female, with gangrene of right foot and lower one-fourth of right leg. Moist blebs around ankle. Marked edema over entire right lower extremity which is one-third larger than normal. Left lower extremity shows slight edema but no discoloration.

*Heart.*—Pericardial sac contains a few drams of clear fluid. Heart normal in size; postmortem clots easily detached. Valves and muscles normal. Coronary arteries contain no thrombi.

*Lungs.*—Recent adhesions over both pleural sacs, which are free of fluid.

Right lung lower lobe shows bronchopneumonia and abscess  $\frac{3}{4}$  inch in diameter near base. Surface of both lungs covered with small dark areas of anthracosis. Right and left pulmonary vessels contain no thrombi. Bronchi normal.

Left lung normal.

*Diaphragm.*—Level fourth rib right side. Level fifth rib left side.

*Abdomen.*—Peritoneal cavity contains pus extending up to diaphragm and the coils of intestine are matted together.

*Spleen.*—Covered with exudate of fibrin; enlarged, soft on section, Malpighian bodies not distinct.

*Liver.*—Normal. Pancreas normal.

*Gall-bladder* contains small amount of thin fluid. Section of portal vein shows no thrombus.

*Kidney.*—Normal in size. Cortex somewhat pale, surface smooth, capsule strips readily.

*Adrenals.*—Normal.

*Stomach.*—Normal.

*Intestine and Appendix.*—Normal.

*Uterus.*—Normal size; external os contracted. Endometrium normal. No evidence of pregnancy in uterus. Tubes normal. Right ovary contains corpus luteum size  $\frac{3}{4}$  inch by  $\frac{1}{2}$  inch.

*Bladder.*—Normal.

*Aorta.*—Free from sclerosis. Bubbles of gas in vessels.

*Inferior vena cava* from a little below diaphragm contains an adherent thrombus occluding more than one-half of its lumen. The common iliac vein on the right side is partially occluded. The right external iliac and femoral veins, as far down as the dissection was made (to the popliteal space) were absolutely occluded, as were all the branches. The left common iliac vein was partially occluded; the left external iliac vein was absolutely occluded by an adherent thrombus to the beginning of the femoral vein where the thrombus terminates.

All the accompanying arteries were normal.

*Bacteriological Findings.*—1. Culture from spleen: negative. 2. Pus from abdomen—large Gram positive bacillus (*B. aerogenes capsulatus*) and Gram positive cocci in chains and in pairs.

3. Pus from lung abscess: Gram positive cocci in pairs and in chains.

*Résumé.*—We have then a condition of gangrene of the right foot and leg following a septic abortion due to a mixed infection of *B. aerogenes capsulatus*, streptococcus and a diplococcus, starting as a thrombophlebitis of the right broad ligament and involving the inferior vena cava, both common iliac veins, both external iliac veins and the femoral vein on the right side, while the arteries are in no way involved. Associated with this condition we find a pyemia, bronchopneumonia, abscess of the lung, general peritonitis and death.

3 RIVERSIDE DRIVE.

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## REPORT OF A VERY LARGE FETUS.

BY

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IN the Journal of the American Medical Association, September 23, 1916, I read with great interest of the case reported by D. P. Belcher, M. D., Sale City, Ga., of a child weighing 25 pounds at birth, and also the editorial comment, which included some very interesting figures concerning very large children. In twenty years of obstetric experience, during which period I have had access to many thousands of histories of hospital patients, the largest infant of which I have had personal knowledge, weighed 15 $\frac{1}{4}$  pounds and inasmuch as such large children are exceedingly rare, a short history of the case may be of interest. In 1896, while I was resident obstetrician at the Sloane Hospital for Women in this

city, a physician living on the east side of the city, asked if I would be interested in seeing a baby which he said "weighed 20 pounds." Naturally my curiosity was aroused, and I asked him to bring the child to the hospital. He did so, and gave me the following history: the patient had been attended by a midwife, and the head was born spontaneously. Much difficulty was experienced in extracting the shoulders, but the woman was finally delivered of a stillborn child which weighed on the hospital scales,  $15\frac{1}{4}$  pounds.

Except for a fractured humerus the child was physically perfect. The measurements were as follows

Diameters of the Head:	Cm.	Inches
Occipitofrontal.....	12.75	5.1
Biparietal.....	10.25	4.1
Occipitomenta.....	14.00	5.6
Suboccipitobregmatic.....	11.00	4.4
Suboccipitofrontal.....	11.75	4.7
Shoulders.....	14.25	5.7
Circumferences:		
Occipitofrontal.....	40.00	16
Suboccipitofrontal.....	39.00	15.6
Shoulders.....	48.00	19.2
Abdominal.....	44.50	17.8
Hips.....	43.00	17.2
Thighs.....	25.00	10.0
Arm.....	15.00	6.0
The length of the child was.....	60.5	24.2

In order to ascertain the experience of well-known obstetricians, the writer sent letters to the following men, who were good enough to respond as follows:

Dr. E. B. Cragin, Professor of Obstetrics in the Columbia College of Physicians and Surgeons, informs me that "In 37,100 deliveries at the Sloane Hospital for Women, we have had only two normal babies weighing over 12 pounds. One weighed  $12\frac{2}{16}$  pounds, the other  $12\frac{3}{16}$  pounds. A few monsters have weighed more."

Dr. S. W. Lambert writes me that in private work he had two babies, one weighing  $14\frac{1}{2}$  pounds the other 15 pounds, both born of the same large parents, and both of whom are alive and well.

Dr. J. C. Edgar, Professor of Obstetrics in Cornell University Medical College, reports the largest baby in his practice, weighing  $13\frac{3}{16}$  pounds.

Dr. E. P. Davis, in a recent letter, says, "The largest baby, not a monster, which I have ever seen, weighed a little over 13 pounds possibly, to be exact, 13 pounds only. Your record of a child weighing 15 pounds, 11 ounces, is larger than anything that I have ever

seen. I congratulate you on your experience in having personally weighed so large a child."

Dr. B. C. Hirst writes, "The heaviest child I have ever had under my care weighed 14 pounds, 15 ounces. Your case, therefore, surpasses mine considerably."

Dr. A. B. Davis, of the Lying-In Hospital, says that in the service of the hospital where more than 100,000 women have been confined, the largest new-born infants weighed 14½ and 15 pounds.

Dr. J. B. DeLee, of Chicago, writes, "I delivered by Cesarean section, a baby weighing 14 pounds, 1 ounce, scales tested by standard, which lived sixteen hours, and died with hyperpyrexia, cause unknown. I know, personally, of no one having a larger infant."

Dr. J. W. Williams, of Johns Hopkins, writes that the largest baby born in his service weighed 6470 grams and was 62.5 cm. long. He estimates that the infant weighed 14.3 pounds.

Dr. J. O. Polak Professor of Obstetrics and Gynecology, Long Island College Hospital, states that the largest child he has seen was an impacted transverse, delivered by decapitation and evisceration, and weighed 14 pounds, 2 ounces.

Dr. J. H. Telfair states, "I have looked up the records for the last three years at Fordham Hospital, and find that the largest normal baby delivered weighed 13 pounds, 2 ounces. I have never delivered one in private practice that weighed more than 10 pounds."

Dr. N. R. Mason, of Boston, sends me the following report of the birth of the largest baby born in the total number of 71,151 Boston Lying-In Hospital cases, covering the period from 1873 to the present time.

"M. W., forty-two years old, was in the Out-Patient Department of the Boston Lying-In Hospital, October 24, 1899. She was an extremely stout woman, but the labor was only a little over three hours in length. The birth of the head occurred normally, but great difficulty was encountered in the delivery of the shoulders. In order to free the shoulders the house officer crawled under the bed and pulled downward and finally their delivery was accomplished. The child was stillborn, a male 24½ inches in length, and weighed 14 pounds, 2 ounces. The baby was weighed by Dr. William L. Richardson, who was Visiting Physician at the Boston Lying-In Hospital and Professor of Obstetrics at the Harvard Medical School."

Dr. F. L. Good, of Boston, writes me that he has personally extracted a baby after podalic version, weighing 14 pounds.

The experience of these men proves the fact that babies weighing 14 pounds or more are very rare and therefore the report of a child weighing 15½ pounds is of sufficient interest to be published.

50 WEST FORTY-EIGHTH STREET.

## HYPERPLASIA OF THE ENDOMETRIUM.

BY

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(With one illustration.)

THE accumulating evidence of recent studies indicates that the explanation of uterine bleeding, as well as of other menstrual disorders, must be sought more and more frequently in a perverted physiology of the menstrual mechanism. Demonstrable structural lesions are responsible for a far smaller percentage of cases than was formerly believed. Certainly it is true that in a large proportion of cases of uterine bleeding, the endometrium is histologically normal. In that important group of cases embraced under such designations as "functional" or "idiopathic," there can be little doubt that the cause lies in a disturbance of physiological or histological nature, and that most frequently it is the function of the ovary or of other links in the endocrin system that is impaired. As I recently heard a well-known teacher in Philadelphia express it, the trouble is with the ovarian trigger rather than with the uterine gun. Unfortunately, direct evidence of the physiological rôle of the ovary in menstrual disorders is still lacking. It is obviously hard to secure.

On the other hand, the endometrium is a tissue easily obtainable and, from a histological point of view, easily studied. Certainly no one can complain that the study of the endometrium has been neglected. The fault would almost seem to lie the other way. The time is not so long past when it was the special target in both the explanation and the treatment of menstrual disorders, as well as of leukorrhea and other symptoms supposedly indicative of "chronic metritis." It is on this conception that the former popularity of cureting, local application and cauterization in all such conditions was based.

The gynecological pathologist, in the innocence of ignorance, was an unwitting accomplice in these frequent raids on the endometrium, for he was usually "there" with some such pathological report as chronic hypertrophic glandular endometritis or chronic hyperplastic glandular endometritis. The histological pictures leading to these diagnoses we now know are due to the physiological activity of the endometrium, and hence are absolutely normal. We furthermore know that the endometrium is usually normal even in association with the common inflammatory and neoplastic diseases

of the pelvic organs. In short, it may be said that, aside from such grossly obvious causes of bleeding as cancer or polypi, there is no histological picture in the endometrium which may be considered "pathognomonic" of any clinical symptom or syndrome—with the single exception of the condition known as hyperplasia of the endometrium.

In 1900 Cullen(1) for the first time called attention to an interesting condition of the endometrium which invariably manifests itself clinically by uterine bleeding. He says "In July, 1895, Dr. H. Meek, of London, Canada, sent me scrapings from a woman twenty-five years of age. Up to her nineteenth year the menses were regular, but since that time there has been an almost continuous hemorrhagic, discharge. At the age of twenty-one she came under Dr. Meek's care, and had been curetted by him, on an average, every three or four months. The patient has been married two years, but marriage has in no way altered the condition. There is no pain, and the only thing she complains of is weakness following the hemorrhages. After being curetted, she gains rapidly and remains well for about three months, after which time the hemorrhages recur. Her sister, who is three years older, has manifested similar symptoms, but not of so severe a type. Both women have remained sterile, and in both the uterus is sharply anteflexed. The appendages are normal.

"*Gyn. Path.*, No. 799, July 13, 1895. The specimen consists of a moderate amount of uterine scrapings. On histological examination the surface epithelium is seen to be intact. The glands are abundant; many are small and round on cross-section, but quite a number are dilated. All have an intact epithelial lining. The lumina of the dilated glands contain some desquamated epithelium and granular material. The stroma of the mucosa is very rich in cellular elements; the nuclei are slightly larger than usual. Numerous nuclear figures may be seen scattered throughout the stroma, and were it not for the fact that the spaces between glands are everywhere approximately equal, one might suspect sarcoma."

The condition was again described in 1904(2) and, later, in 1908(3), as follows: "Clinically we have a by no means small group of cases in which a patient, usually between forty and fifty, comes complaining of a very profuse menstruation and at times of an intermenstrual flow or a leukorrheal discharge, and in which carcinoma of the body of the uterus is suspected. On histological examination we find a most characteristic picture. The mucosa is much thickened. The glands are large and many of them are dilated. This dilatation is, however, not due to occlusion and cyst formation, as



the gland epithelium is proliferated and higher than usual instead of flattened. Many of the enlarged glands are irregular in outline. The stroma of the mucosa is very rich in cell elements and nuclear figures can at times be detected. I am at a loss to give the condition a definite name. With such a mucosa one can say with absolute certainty that the patient has been subject to very free uterine bleeding. It is not malignant."

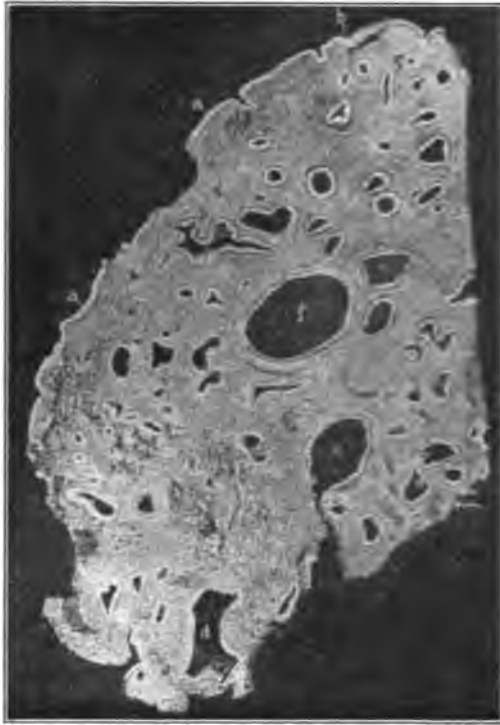


FIG. 1.—Hyperplasia of the endometrium. Note dilatation of some of glands without flattening of the epithelium. The stroma between the glands is dense. "Given such a mucosa as this, one can say with almost absolute certainty that the patient has had very profuse menstrual bleeding." (*Gyn. Path.*, No. 7026, after Cullen.)

The illustration accompanying this description, which is here reproduced (Fig. 1) shows clearly the general histological pattern of this condition, especially with regard to the gland elements.

Under the name of hyperplasia of the endometrium, which was suggested by Dr. William H. Welch, this histological picture was again emphasized in 1913(4). "These patients are usually from thirty-five to forty-five years of age, but I have noted the condition in girls in their teens. The flow is excessive and the menstrual

periods may be almost continuous. There is usually no intermenstrual discharge, however. The mucosa is much thicker than usual. On microscopic examination the surface epithelium is found intact. Some of the glands are very small, others much enlarged. The large glands may be either circular or tortuous. All are lined by thickening epithelium and the stroma is excessively cellular. Often the nuclei of the stroma cells contain nuclear figures. Scattered throughout the stroma are frequently found large venous sinuses, some of which are thrombosed. Cancer of the body of the uterus is diagnosed from its pattern and, secondly, from the changes in the individual cells. Gland hyperplasia histologically bears absolutely no resemblance to it."

Although the condition has thus been repeatedly described by Cullen, I am convinced that it has not received the attention which its importance justifies. It is of interest to note that this characteristic histological alteration has recently been "rediscovered" by Schroeder(5), who is apparently unaware of Cullen's earlier publications on the subject. Curiously enough, this German author has given to the condition the same name as that bestowed by Cullen at the suggestion of Dr. Welch. The characteristics of the condition as described by Schroeder differ in no important respects from those described many years previously by Cullen.

The cases of "endometritis necrobiotica" described in 1914 by Driessen also are to be grouped under the head of hyperplasia, although their importance in causing uterine hemorrhage does not seem to have been sufficiently emphasized by Driessen(6).

A large number of cases of hyperplasia of the endometrium have been encountered in the Gynecological Department of the Johns Hopkins Hospital. Grossly the mucosa is usually much thicker than normal, and not infrequently presents a shaggy or even markedly fungous appearance. The hyperplastic change seems to affect both the epithelium and the stroma. The former is distinctly thickened, the nuclei being heavily stained and closely crowded, at times giving the impression of a number of distinct layers. The glands are uneven, some being narrow, some moderately tortuous, and some very much dilated, appearing like small cysts. That the overdistention of the glands is not due to mere retention of their contents is indicated by the fact that the lining epithelium, instead of being flattened out, is often quite high. The smoothness of the walls and the lack of tortuosity in these large dilated glands gives them a characteristically rigid or parchment-like appearance. The stroma gives the impression of compactness and overabundance. Its hyperplastic activity is often indicated by the presence of mitoses.

Although karyokinetic figures are common in the epithelium of the uterus, they are almost never observed in the normal stroma. Another finding of great frequency is the presence of numerous thromboses, as well as of large veins distended with blood, and perhaps of hemorrhagic extravasations in the tissues.

Hyperplasia of the endometrium occurs most frequently at or near the time of the menopause, and next most frequently in young girls within the first few years of menstrual life. It may, however, be encountered at any period during the reproductive life. The characteristic clinical symptom is excessive and prolonged menstruation. Metrorrhagia is much less frequent.

As yet little attention has been paid to the question of whether this condition in the uterine mucosa is primary or whether it is secondary to an underlying disturbance of the ovarian or other internal secretions. My own feeling is that there can be little doubt that the local alteration in these cases represents merely the passive response of the endometrium to an aberration of the fundamental cause of the menstrual flow. The only investigation of this subject with which I am familiar is that of Schroeder(5), who concluded that for some unknown reason there was a failure of follicular rupture and consequently of corpus luteum development in these patients. Inasmuch as the corpus luteum is essential for the secretory and hypertrophic changes characteristic of the endometrium just before menstruation, these changes also are lacking. The development of the endometrium stops just short of the secretory phase, *i.e.*, at the end of the proliferative stage, which, as Schroeder believes, is due to the influence of the growing follicle and not of the corpus luteum. Schroeder's assumption that the histological picture of hyperplasia is similar to that seen at the end of the proliferative stage of the premenstrual period does not, however, seem to me to be justified. The usual absence of marked degrees of tortuosity of the glands, the common occurrence of cyst-like dilatation, the thickening of the epithelium, the presence of nuclear figures and of large thrombosed vessels in the stroma—all these speak against an identity of the two conditions. At any rate, it would seem that much confirmatory work will be necessary before Schroeder's results can be accepted. On the other hand, if, as most of us now believe, the usual cycle of changes in the endometrium represents a local response to the ovarian stimulus, it is easy to understand how a disturbance of the latter, especially of its rhythm, might produce a confusion or muddling of the endometrial reaction, which takes the form of what we call hyperplasia. For the final solution of this problem we shall have to

wait for a fuller knowledge of the menstrual mechanism, and especially of the rôle of the endometrium.

I have been led to submit this brief review of the subject of hyperplasia of the endometrium because of its relative frequency, its great practical importance, and the frequency with which it is overlooked. Finally, it seems well worth while to show that the credit for first describing this condition and emphasizing its importance in association with uterine bleeding clearly belongs to American investigative medicine.

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- 26 EAST PRESTON STREET.

### THE RESIDENT PHYSICIAN IN HIS RELATION TO OPERATIVE GYNECOLOGY.\*

BY

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THIS hurriedly written and imperfect paper in both construction and diction was prompted by a communication received recently from one of my most worthy colleagues at St. Agnes Hospital in which he submitted for my approval rules for the guidance of the internes in the gynecological department of that institution, and among these was one advocating that the resident "should have the opportunity of performing minor gynecological operations under the supervision of the chief or the assistant chief."

While I have long since recognized some of the objectionable features of such a practice I, with numerous gynecologists of my acquaintance, have extended this privilege to many of our internes, but never did I appreciate its serious significance so keenly as when I was confronted with the request of giving it my sanction as a recognized rule of our department.

There is no one present but who will agree with the statement that

\* Read before the Obstetrical Society of Philadelphia, February, 1, 1917.

no branch of surgery requires more prolonged and constant application for securing and maintaining an educated touch in diagnosis, none that demands a maturer professional judgment in the analysis of symptoms and of physical findings for success in practice, and that in none, therefore, is a little knowledge so misleading and so dangerous as in the department of operative gynecology, not excepting even the surgery of the eye; and yet, I am confident that, contrary to the practice of some of us no eye surgeon would so much as permit the resident of the average general hospital to assume that he could do the least part of his operative work, and much less would he think of lowering the standard of his specialty by personally guiding the hand of the resident in the successful performance of an ophthalmic operation, lest such encouragement might lead to serious blunders by occasional attempts to attain perfection in undertakings of a like character after he leaves the institution.

The interne during his limited service in this department may learn something pertaining to diagnosis, and secure a minimum knowledge of refraction. He may be taught good nursing in the care and treatment of eye patients, how to meet unavoidable emergencies, and last but by no means least, how to determine the necessity, not only for securing an expert opinion in a given case, but expert treatment. Not until after a man has permanently identified himself with the department, has assisted in a large number of operative cases, and shows an aptitude and interest in the work by special studies and dissections of pigs' eyes, and other laboratory work of a like character, and thus manifests a sincere disposition to take up the subject seriously is he permitted to do even the most trivial of operation.

But we, as gynecologists, instead of frankly recognizing the legitimate functions of the resident in his relation to the various departments of the hospital through which he passes in clove succession, when he enters our service, practically ask him to lower the importance of gynecology in his estimation as a highly specialized branch of surgery by encouraging him in the performance of operations which in themselves may appear simple enough and result in no harm on properly selected and intelligently supervised hospital patients, but which owing to their ease of execution may, and frequently do, lead to the most serious consequences in his hands as an unguided tyro in gynecological diagnosis upon assuming the personal responsibilities of a general practitioner subsequently.

The ophthalmologist and the gynecologist are not unlike each other in human feelings, but for some reason or other, the former abhors the wanton destruction of organs that can be seen, and in

which the responsibility for maltreatment can be definitely placed, while the latter not infrequently contemplates with apparent indifference the destruction of equally, if not more, important vital structures by the sporadic surgical efforts of his ex-resident, whose errors in pelvic diagnosis and the consequent results of his operative blunders in being hidden from view afford exceptional opportunities for making misleading, though plausible explanations for the comfort of his afflicted victim, or as the case may be, to satisfy the credulous friends of the deceased.

A dilatation and curetment of the uterus by many is regarded as a gynecological procedure of minor surgical importance. While this may be true in the restricted sense of operative technic, when considered in connection with its possible influence on the health or life of the patient, it may assume all the proportions of a grave major surgical operation.

A mere reference to the fact will be sufficient to recall to your minds experiences that have occurred to many of us in the treatment of acute exacerbations of previously quiescent inflammatory processes with resulting widespread destruction of hitherto uninvolved genital structures, and not infrequently death of the patient as a consequence of ill-advised curetments in futile attempts to correct uterine symptoms that were nothing more than localized expressions of these previously unrecognized pathologic conditions in the hidden recesses of the pelvis.

This leads me to state that gynecologists all over this country to-day are responsible for an enormous morbidity and not a few deaths among women as a result of this pernicious practice of encouraging hospital residents, and family practitioners, in the use of the curet, instead of impressing upon them its dangers, and its uselessness to the man who has not served a well-appointed apprenticeship in gynecological diagnosis and in the training of a surgical judgment adapted to pelvic conditions.

Secondary plastic operations of the genital tract likewise are classed by some among the minor gynecological procedures, and yet, nothing in our specialty demands a more comprehensive knowledge of pelvic support and of the pathologic significance of lacerations and relaxations, and but few things in surgery require more constant, patient and thoughtful practice than that necessitated for learning to do well the plastic surgery of the cervix and pelvic floor.

Have you ever witnessed a general practitioner with an occasional experience in plastic work do a secondary trachelorrhaphy or peri-neorrhaphy? Family practitioners capable of performing an imme-

diate or intermediate perineorrhaphy with variable degrees of success may be found in almost every civilized community, but I have yet to meet with one who lacks the knowledge that can alone be acquired by special study and constant practice, who can do a secondary plastic operation in a fashion approaching decency, and if you want to see how badly plastic surgery of this character is done by many of those even who pretend to know how to do it, but who should know better than attempt it, go and witness the work done by some of our general surgeons, who in their blissful ignorance of the subject still continue to repeat the familiar refrain that such work merely is a part of general surgery.

Those of us who are especially interested in this branch of gynecologic surgery may differ in theories, modes of procedure and in operative skill, but generally speaking, each one of us has given the subject the study and thought that its great importance demands and each has adopted or elaborated a plan in operative technic that, barring occasional failures, usually gives satisfactory results.

In the face of such facts, all the ordinary interne of the average hospital could learn by permitting him to do a half dozen plastic operations during his limited stay in the gynecological service, would be an appreciation of the damage done to patients by his bungling efforts.

The interne of a general hospital who is obliged to divide up his time in the service of from six to eight different departments during a total of only twice the respective number of months can at best secure a superficial knowledge of the intricacies involved in the study and practice of the various specialties however valuable an asset such knowledge may prove in giving him a generalized view of medical and surgical practice.

While the interne may be instructed and guided in operative procedures for the correction and removal of abnormalities of the vulvar structures surgically unrelated to intrapelvic disease, operations of major proportions even with resultant advantages in the acquirement of both surgical judgment and skill, and with benefit, therefore, to his patients in future practice, and even though a man of exceptional promise may be permitted to operate on uncomplicated abdominal and supravaginal pelvic conditions, the fact cannot be too strongly emphasized that even such a man still remains woefully deficient as a trustworthy preoperative gynecological diagnostician, and for the good of his patients, and for the sake of his professional reputation as well, of all the instruments he should shun to use upon engaging in general practice and one,

therefore, that might well be missed in providing himself with a surgical outfit, would be the uterine curet.

JEFFERSON MEDICAL COLLEGE.

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## TRANSACTIONS OF THE NEW YORK OBSTETRICAL SOCIETY.

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*Meeting of January 9, 1917.*

*The President, JOHN O. POLAK, M. D., in the Chair.*

DR. W. H. W. KNIPE reported a case of

### PUERPERAL GANGRENE OF THE LEG\*

DR. A. A. HUSSEY described a case of

### INTERRUPTION OF PREGNANCY AND STERILIZATION AT FOURTH MONTH IN A TUBERCULAR PATIENT BY ABDOMINAL EXCISION OF FUNDUS UTERI WITH OVUM IN SITU.

Mrs. I. F., aged twenty-two, in the fourth month of gestation, entered the obstetrical service of the Brooklyn Hospital on October 23, 1916, for consideration of interruption of pregnancy and sterilization.

She was twenty-two years of age, with good family history and normal health up to three years ago. She was married at sixteen and had three children by easy labors. After the last child was born in August, 1913, she began to have dysuria, frequency of urination and pain in bladder region.

In the fall of 1914 she was treated at the Brooklyn Hospital for acute pyelitis, cystitis and bronchitis.

In April, 1915, her left kidney was removed. It was large, studded with tubercles and contained many abscess cavities. The pathological report was tuberculosis of the kidney. At the time of her operation the urine from her right kidney was normal. Her bladder showed many ulcers about the ureteral openings and on the trigone.

In her lungs she had signs of catarrhal bronchitis, localized in the lower right lobe. No tubercle bacilli were found in any of her secretions at any time. She had a cough most of the time, from the birth of her last child until the nephrectomy. After her kidney was removed she gained steadily.

She left the hospital May 30, 1915, with her wound healed and her general condition improved. She spent six weeks at White Plains and gained 10 pounds. In December, 1915, she reported steady improvement.

\*For original article see page 988.



In October, 1916, she reported three months pregnant, and not feeling well, and was advised to enter the hospital.

On admission her general condition was fair, her pulse 100, temperature normal. The heart was negative, and her lungs showed no signs of acute trouble. Her urine was clear, amber, acid, 1034 and contained a trace of albumin and a few epithelial cells. She excreted 30 to 40 ounces daily. The functional test gave 810 c.c. with 42 per cent. dye in three hours.

She suffered with headaches almost daily and had occasional night sweats. She also had pain in the bladder region and dysuria and frequency.

After consultation with the other members of the Gynecological and Obstetrical Staffs and a representative of the Medical Staff, it was decided that her pregnancy should be terminated and sterilization performed, on the ground that her recent serious trouble and the possibility of the disease attacking her remaining kidney, made pregnancy a perilous condition for her.

On November 1, 1916, the fundus uteri with ovum *in situ* was removed by the abdominal route under morphine and gas oxygen anesthesia. The operation was well borne. The loss of blood was slight. The convalescence was rapid and easy. Her highest temperature was 100.6° F. on day of operation. Her wound healed by primary union.

She left the hospital on the twenty-second day postoperative, and was sent to White Plains where she stayed three weeks.

On January 8th, she reported general improvement, with a gain in weight of 6 pounds. She menstruated in November and December, one and one-half days, using three or four napkins.

Her bladder still gives trouble. Cystoscopic examination shows a few small ulcers of the trigone, the right ureteral opening a little thick and red gaping, the left side of the bladder distorted by the retracted left ureter. The capacity of the bladder is 4 ounces.

At first thought it may seem that the operation chosen was unnecessarily radical. The procedures in use for this condition are: (a) Vaginal operations:

(1) Induction of abortion and sterilization by subsequent laparotomy. This was declined as uncertain, subject to the risk of hemorrhage and sepsis, and necessitating two operations.

(2) Vaginal hysterotomy with or without resection of tubes through incision in anterior fornix. Werner (*Zentralblatt f. Gynakologie*, No. 43, 1913), reports sixty cases by this method with morbidity in eight cases, mortality in one, excessive bleeding in ten cases, and one in which vaginal hysterectomy had to be done to control bleeding. This operation should be reserved for early cases—or cases where the outlook for improvement is good and sterilization is not indicated.

(3) Amputation of the fundus uteri with ovum *in situ* as recommended by v. Bardeleben. The conditions presented by my patient were not favorable for a vaginal operation, as she had a small vagina and a uterus nearly one-third way to the umbilicus. An abdominal operation was therefore elected. Here we had a choice of:

(1) Total hysterectomy, as recommended by Martin (*Zentralbl. f. Gynakologie*, 1911, No. 29), who has reported twenty-six cases, sixteen of which were serious when operated upon, with a mortality of six cases at the end of a year, and improvement in sixteen cases. He claims the advantage of increased fat production after castration.

(2) Abdominal hysterotomy and resection of tubes after Sellheim, who has reported ten cases without morbidity (*Monatschr. f. Geburtsh. und Gynäk.*, 1911, No. 29). Against this operation may be urged that the bleeding is apt to be excessive and that there is risk of implanting tubercle in the peritoneal cavity, as the placental site is infected in 45 per cent. of cases, according to Schmorl.

(3) Resection of the fundus uteri with ovum *in situ* as done by v. Bardeleben. This seemed to be the operation of choice in advanced cases, as it is accompanied by little hemorrhage, slight risk of soiling the peritoneum, and does not cause the unfortunate sequelæ of the artificial menopause.

#### DISCUSSION.

DR. HERMANN GRAD.—“There is one thing to decide for or against hysterectomy in these cases and that is the possibility of implanting tubercle bacilli from the placenta into the uterine incision. If that constitutes a real danger then this operation is a better one, but if not (I do not know that this point has been determined), I think this operation is a little too much for the majority of cases. Hysterotomy, with resection of the tubes at the horn of the uterus, is a much simpler operation and less dangerous to the patient. However, if Dr. Hussey can tell us that there is real danger of infection of the uterine incision with tubercle bacilli from the placenta, then I shall give up hysterotomy and do this operation entirely.”

DR. HAROLD BAILEY.—It seems to me that in discussing this subject we should consider the fact that the uterus after the fourth month can be emptied from below without an anesthetic and without the necessity of a hysterotomy. I think that should receive more consideration.

DR. RALPH WALDO.—“I have had occasion to empty the uterus after the fourth month in quite a good many instances and have never had a fatality, but in all the cases where I have emptied the uterus the patients lost a lot of blood. I believe it is important to save blood for these patients and as either the operation that was performed here or hysterotomy is accompanied with very much less loss of blood, they are therefore indicated in this class of cases.”

DR. A. A. HUSSEY in closing the discussion said: “I feel there is some risk in shelling out the ovum by the abdominal route. Schmorl makes the statement that the placenta is the site of tubercular infection in bad cases in about 45 per cent., and other good authorities I believe say they have corroborated that statement. Many years ago I had a tubercular patient with a deformed hip. She had also anal fistulæ which were probably tubercular. After a test of labor I did a Cesarean section and she made a good recovery

and left the hospital at the end of two weeks. I dismissed her from my mind as a patient who was going to do well and was very much disappointed the following year to learn from her physician that she had died about four months after leaving the hospital of chronic peritonitis. While I have no proof that it was a tubercular peritonitis, still I believe that woman got up a tubercular peritonitis. This statement is not of any particular value in the discussion from your point of view because I have no proof that it was a tubercular peritonitis but she died of peritonitis and had left the hospital in good condition and had no postoperative complication. I prefer, therefore, to resect the fundus uteri with the ovum *in situ* rather than to shell it out and do not believe that this procedure is any more risky. I do not think there is any more blood lost and it is not any more difficult.

DRS. H. W. VINEBERG and S. WIENER presented a paper on

#### THE TREATMENT OF SEPTIC INCOMPLETE ABORTION.\*

DR. G. L. BRODHEAD, in opening the discussion said: "Unfortunately I did not hear the first part of the paper but from the portion which I have heard I should assume that the treatment of the majority of these cases was the treatment of immediate operation unless there was some contraindication because of pelvic exudate or something of that kind. It seems to me that we should make up our minds in treating these cases whether they belong to the sapremic or mild type, or the true septic type. In the first class of cases we generally find those women who have aborted within a day or two, where the bleeding is slight or moderate, where there is a dilation of one or two fingers, where we can feel products of conception in the cervix or lower uterine segment, where there is no tenderness in the adnexa and where the temperature may vary from 100° to 105° F. In these cases we have always performed the operation of curettage, using the placenta or ovum forceps to remove the larger portions of the secundines, but rarely resort to the use of the sharp curet, although the sharp curet in the hands of a competent man is perfectly safe. I think, however, that we can get good results with the use of the placental forceps and the blunt, round Braun curet. After the curettage we usually paint the interior of the uterus with tincture of iodine and if there is profuse bleeding we pack, otherwise not. We have had cases where hemorrhage has been profuse in spite of the fact that the uterus is known by digital palpation to be empty. In those cases we resort to tamponade with iodoform gauze. Referring to the second class of cases, the true septic type, it is better to leave the uterus alone, as the products of conception will come away later. The patient is placed in Fowler posture, an ice bag applied and ergot with nux vomica administered. Most of these cases recover under the nonoperative plan of treatment."

DR. F. C. HOLDEN said that he doubted the advisability of pub-

\* For original article see page 975.

lishing a paper of this character; that papers of this character would simply mean a few more septic cases in Greenpoint Hospital; that he felt the younger men would be inclined to misinterpret the intention of the paper; that the fact that it came from the New York Obstetrical Society would make it appear authoritative; that the older men who are actively engaged in gynecological work would understand the points which were made in the paper, but he doubted whether he could say the same for the younger men; and that in view of all of the above he very much doubted the wisdom of publishing this paper and the discussion thereon.

DR. J. MILTON MABBOTT.—“I stand for full publication of a discussion of this kind, so much so that I desire to recite a case in which I, as family physician, sent a patient into a New York hospital within the past three months. I saw the assistant attending surgeon into whose service the case was going. He gave the operation to the house surgeon and reported to me three days later (I did not see the operation) that when he irrigated the uterus after the house surgeon had curetted the patient, the irrigation nozzle went so far that he was satisfied there was a perforation of the uterus. By reason of the septic condition of the case he then felt obliged to open the abdominal cavity. He told me that on opening the abdominal cavity he found a large flacid tumor which appeared to him to be a hematoma, and that he was so satisfied at a glance that it was a hematoma that he snipped it with scissors and urine gushed forth and there was, therefore, an over-filled bladder which he had to sew up. He said to me, ‘We are not sure that the house surgeon made the perforation, but I confess that I accidentally opened the bladder, and the trained nurse who prepared the patient for operation had failed to pass a catheter and hence the bladder was opened.’ This occurred in a high-class hospital in New York City. The patient recovered though not uneventfully, and in six weeks was discharged from the hospital.”

DR. E. W. PINKHAM.—“I do not want to prolong this discussion, but four or five years ago I read a paper before this Society on this subject, in which I took the same stand as Drs. Wiener and Vineberg, and since then I have been pretty hard worked to live up to what I wrote at that time. I think that it is the study of the individual case that will enable us to decide which is a septic uterus and which is not.

“I had a case about three and a half years ago which came into the hospital with an initial history of an induced abortion. I kept her in bed three weeks and the temperature subsided in three or four days after admission, but she kept up a little discharge, sometimes with a little odor. At the end of three weeks I thought it would be a good idea to clean her out, which I did. Three days after the patient died of one of the worst types of sepsis that I have ever seen. I had another case which was similar to the one I have just mentioned. In this latter case I did not curet. The patient had no temperature and died five days after admission. At autopsy the uterus was found to be large enough to lead one to suspect that it

contained placental remains and would have been a case that should perhaps have been curetted. On splitting the uterus, it was found to contain a heavy fungus growth of the endometrium, edematous. The pathologist reported that there was no evidence of retained secundines.

"It seems to me that it is a tremendous problem. I do not agree with Dr. Holden. I think this paper and the discussion of it should be printed.

"I was more impressed than I can say with the wonderful mortality at Mount Sinai Hospital, and it is very hard for me to understand how a large hospital can have such a mortality rate for strictly septic abortion cases unless it is that they get their cases earlier than we do. I think I should be tempted after this to send my cases to Mount Sinai Hospital."

DR. HIRAM N. VINEBERG in closing the discussion said: "Perhaps a wrong conception has been formed here about our results. This does not mean that all the cases of septic abortions admitted in our service resulted in but three deaths. What I did say was that in the cases of septic abortion with contents in the uterus that were subjected to curettage, only three cases ended fatally. The other cases with septic empty uteri were not included as they were not curetted. As a matter of fact some of the worst cases of infection are those where an attempt has been made to bring on abortion in a uterus that was not pregnant at all. Neugebauer some years ago collected a number of these cases and gave to them a Latin name, which I cannot just now remember, and brought out the fact that some of the worst cases of infection were those in women who had gone a few days or weeks over time and a doctor had tampered with her, put in an instrument and tried to produce an abortion and upon examination it was found that the woman was not pregnant when interfered with."

"I cannot get away from the conviction that when you have a uterus with a lot of material in it which is septic and is giving rise to temperature, that the woman has a better chance of recovering rapidly if the uterus is emptied promptly than if she is allowed to go on indefinitely until spontaneous expulsion takes place. Spontaneous miscarriage will frequently end in total expulsion of the products of conception but in cases of attempted abortion it is very rarely that the uterus empties itself.

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*Meeting of February 13, 1917.*

*The President, JOHN O. POLAK, M. D., in the Chair.*

The program was contributed by the members of the attending staff of the Sloane Hospital for Women. (At the clinics held at the Hospital during the afternoon, Dr. E. B. Cragin gave a brief outline of the teaching in gynecology and Dr. J. D. Voorhees in obstetrics.)

At the evening session DR. E. B. CRAGIN described

THE ORGANIZATION OF THE SLOANE HOSPITAL FOR WOMEN.

REPORT OF CRITICS ON THE AFTERNOON CLINICS.

DR. R. L. DICKINSON, on Dr. Cragin's Clinic.—“It has given me sincere pleasure to be allotted to this review of the clinic of this afternoon. I have long been an admirer of Dr. Cragin for his sane judgment concerning diagnosis and when to operate. It has been my chief instruction in traveling about from clinic to clinic for many years to observe technic and team work and note simplicity in method and to compare the ways of the greatest operators in our line.

“The first case was one of shortening of the round ligaments for retroversion. The transverse incision was short. He placed the loop just under the fascia and sewed it with two chromic gut sutures. Plain gut closed the recti and chromic, interlocking, held the fascia. There was very little Trendelenburg incline. You noticed with what extreme gentleness he treated his peritoneum. He used no sponge, no gauze, wet or dry, to sand-paper the peritoneum. The slightness of the Trendelenburg did not seem to bother him. The operator stood on the right side of his patient with an assistant opposite, and with two sterile instrument nurses and one other unsterile nurse, all with cap with mask on face, of thin gauze; and full covering of the wrists.

“Did you notice how the gloves went on? Dr. Cragin's own gloves were held for him while he got into them. The nurse in changing hers made no break. The right glove was seized by its turned-back cuff. The second glove was then held with the gloved hand inside the turned-back cuff and slid onto the left hand, and the cuffs were then turned into place. You know how some of the great operators of this country put on one glove and use the bare hand to rub down the outside of the gloved hand on which the first glove went. Such ‘little’ things vitiate great results.

“A continuous catgut whipped through the fat with a throw-back as a subcuticular through the skin. The knot was thus laid deep in the fat layer. During the operation the edges of the incision were not covered; that is, his laparotomy well was not protected and there was very little in the way of retraction, but there was very little bruising and very little traction applied to his incision edges. The skin edge was covered for an inch from the incision by clipping towels or gauze to that line. The dressing was a very small one, consisting of three gauze straps and a binder.

“Now, with regard to the operating room: The sterilizer was going full blast in the operating room for the detriment of the workers and not for the comfort of the top gallery. The electric heaters for the warming devices also helped. The patient was not anesthetized on the table, but was brought in anesthetized and trans-

ferred to the table. The anesthetist was a male. The first patient had good anesthesia; the second some stertor and cyanosis. Leg-holders of the usual type with supporters on the legs and loops around the ankles, were used, throwing strain on the sacroiliac joints and the feet into the assistants' faces.

"The second case was one in which the first child was delivered four months ago. Menorrhagia ever since; laceration of the cervix. Patient examined under ether by Dr. Cragin before he operated upon her. As to this examination under ether you know that there are a large number of patients who are not examined by the operator just preceding the operation. It is much more common to see that in Europe than America. Here a retroversion was found. Hand tractor for the perineum; considerable dilatation; curettage done. The operator commented, 'We curet little now.' Irrigation of the uterus. His instruments were laid on the patient's abdomen. There was also a tray on the table over his lap. He was partly handed his instruments and partly reached for his own instruments. In the startling new book by Mr. F. B. Gilbreth there will be discussed (and pictures shown) of operators in this country and Europe, with notes as to whether they pick up their own instruments or have them handed to them, and also as to whether they drop them down in a confused pile or put them in a definite and fixed spot. The efficiency engineer says you have no business to take your eyes off the field of operation. The trachelorrhaphy was done with scissors and knife; one assistant sitting, one standing. The stitches were tied very tight, literally with some effort, so that we had the usual scallop shell edge. The foreign operator is much more likely to tie his stitches with this force than the American, who is more prone to simply approximate the edges gently. One hemorrhoid; Mitchell operation; suture to apex of hemorrhoid; hemorrhoid cut; then continuous whipover stitch chromic; quick and simple.

"The skin preparation is done the day before the laparotomy. Scrubbing and shaving; soap dressing all night; in the morning alcohol; dry dressing. In the operating room, alcohol, then drying, then iodine. Ether by the Bennett drop method. In this case also, there was only the slightest Trendelenburg. Why not more, to shift bowels out of the way? Tray over the knees of the patient. The operator reaches for his own tools. Pfannenstiell incision 'much employed' by Cragin. Appendix, long, free, thick. Ligature on meso; another on the appendix; plain gut; purse string catgut; Paquelin cautery to the appendix stump; inverted; then Lembert for the second layer. The operator said that their practice was the routine removal of the appendix. According to reports from the pathologist only two were found normal in a period of two years. The round ligaments were then shortened. The tubes and ovaries were found to be normal, as in the other case. Appendix removal, Gilliam and closure took eight minutes, without hurry. Gall-bladder and neighboring attic not palpated.

"I would like to ask a question of the doctor (perhaps I did not get the history clear)—Had she had a routine bimanual examination

at the tenth or fourteenth day and at the sixth week, in the Dispensary, as a regular proceeding, after her delivery at Sloane, where you also must find every fifth woman with postpartum retroversion? Had she had a pessary, hydrastis, or hot douches, to control this menorrhagia? In other words, so soon after delivery, finding a healed cervix, and menorrhagia, and a back-fallen organ, had the other treatment been given a proper test?"

## DISCUSSION.

DR. HOWARD C. TAYLOR.—"I have for a long time inverted the stump in the same way that Dr. Cragin does. There are two things that will practically exclude hemorrhage and which can be relied upon to an absolute certainty. In the first place, the ligation on the mesoappendix must be put close enough to the appendix to get the artery. In the second place, the cautery should be used in the removal of the appendix. The use of the cautery will stop any bleeding that there may be from the stump of the appendix."

DR. EDWIN B. CRAGIN.—"I wish to thank the Society and especially Dr. Dickinson for his very kindly criticisms. It is good to see ourselves as others see us, and we wish kindly criticism by our friends because it is the greatest incentive to improve our work.

"Now, with regard to the cause for the operation in the second case. The woman came complaining of two symptoms rather than one. The two symptoms were menorrhagia and a very profuse leukorrhea, the leukorrhea annoying her almost as much as the menorrhagia. Therefore, whatever we did for the woman, she was anxious to be relieved of those two symptoms. We, accordingly, looked first at the cervix and thought we saw in the condition of the cervix the cause of the leukorrhea; and an enlarged fundus was the explanation of the menorrhagia. She had not had treatment by pessary. She had not had medical treatment by hydrastis or ergot because she was a woman that had been delivered at Sloane and had left Sloane on the thirteenth day and we had not seen her for some time. If she could have come to one's office or clinic I think it would have been perfectly proper to treat her by pessary and medication, but she came to us wishing to be relieved and to be relieved rapidly of her menorrhagia and cervical catarrh.

"Now, since we had to operate on her for her lacerated cervix to cure her leukorrhea and curette her for diagnostic and curative purposes, it did not seem wise to send her out with the possibility that the retroversion might not be cured by a pessary. It seemed to me that since she had to have an anesthetic and a vaginal operation, she had better have a shortening of the ligaments and be put in good condition for going on with her work rather than the possibility of cure by months of treatment. That is the reason for the Gilliam operation in addition to the cervix. Further than that, working along the principles advocated and followed by Dr. Dickinson, if you are going to repair the cervix according to the Emmett



method, it is wise to do so early before the tissue becomes cystic. That is the reason for repairing the cervix and the reason for doing the Gilliam in addition to the appendix."

"In regard to the disposal of the stump of the appendix: I think Dr. Taylor has answered that question completely. Dr. McBurney taught me what I know about the removal of the appendix. He did not like to do gynecology and, fortunately for me, he generally turned his gynecological cases over to me, and in return I turned my appendix cases over to him, and in watching him operate he taught me. I never saw any trouble from hemorrhage for the two reasons that were mentioned by Dr. Taylor. We are very careful to suture the mesoappendix close up to the base of the appendix so as to include the artery, then surround the appendix with a purse-string catgut suture, then amputate and cauterize the stump, then invert the stump and tie the purse-string suture, then reinforce with a Lembert suture.

"I think that answers the two questions as far as our experience goes. We have never had any trouble from hemorrhage.

"In regard to the investigation of the gall-bladder as referred to by Dr. Ward: we have been depending on the symptoms, which we go into, and if there is anything suspicious about them we always examine, but we do not run the hand far up there unless there is something suggestive in the history.

DR. GEO. L. BRODHEAD gave a review of Dr. Voorhees' Clinic.

"Dr. Voorhees' first case was one of induction of labor. This patient had, according to her calculation, gone a month beyond the full term, but, as Dr. Voorhees said, it probably was a miscalculation on her part, and the case seemed to be a good one for clinical teaching. He told us the various indications for induction of labor at the Sloane Hospital, and also gave us the proportion of bag cases.

"The patient was prepared by a nurse who, I think, did not wear sterile gloves. I think the ideal method of preparing all patients for operation would be preparation by a staff man or a nurse who wears sterile gloves. Dr. Voorhees gave a preliminary vaginal douche. That, I think is an eminently proper thing to do. Some men even go so far as to say that every patient who has labor induced should have the vagina scrubbed out with soap and water and a saline douche given. I think in the vast majority of cases, unless there is some reason to suspect infection through careless examination, that a preliminary douche with lysol or normal salt solution is sufficient. I think the douche is a good plan because in some of these patients intercourse has probably been held within two or three days of the time that the induction of labor is to be done. I have had a number of experiences of that kind."

"Induction of labor by touch, as Dr. Voorhees did in his case, may be criticised but I find that in a vast majority of cases it is easier to put the bag in by the sense of touch, than by inspection. If, however, you have a primipara with a practically closed cervix and anticipate difficulty in getting the bag in, I think it is better to put in a speculum, seize the cervix and put the bag in by inspec-

tion, but in this case the bag was easily introduced by touch. Those of you who have tried to put the bag in by inspection in multiparæ, know how difficult it is sometimes to get the bag in on account of the relaxed vaginal walls. I think in those cases it is easier to do it by the sense of touch. With reference to the bag itself, Dr. Voorhees stated that as a rule he put the bag in by simply rolling it up. Personally I have found that very hard. I think it is easier to pull the end of the bag out and then roll the bag up. You are in this way introducing the small end of a cone into the cervix rather than the blunt end of the bag. It makes it easier to put it into the uterus by rolling the bag up and then pushing it in."

"Dr. Voorhees showed a number of cases of abdominal scars from operations of various kinds. He also showed a very interesting case of pyelitis, stating that surgeons were very apt to attribute any pain in the right side to appendicitis and that, as a rule, the obstetricians think first of pyelitis. We see a good many cases of pyelitis and agree with Dr. Voorhees that cases of pyelitis during pregnancy generally terminate favorably. He mentioned a case with high temperature that came out well. He was fortunate enough to have a labor case for us, the patient a multipara. The woman was duly delivered without any special difficulty and the baby was held up immediately by the feet, which I think is proper, but it was not held up long enough. I think it is better to hold the baby up until the mouth and throat are thoroughly cleared of mucus. In this particular instance the baby was held up for one or two minutes but the mouth and throat were still full of mucus and finally the nurse cleared out the mouth, but if the baby had been held up a little longer the mouth and throat would have cleared out and then the child should have been placed on one side or the other, preferably the right side, as I remember Dr. Flint taught us years ago.

"There is only one point of criticism of the technic employed. The physician confining the patient put on sterile gloves, then wrapped a towel around his hand, scrubbed the genitals, then took off the towel and delivered the patient with his sterile(?) gloves, which had not been changed. Then with the same gloves which had been scrubbed, he came back again and delivered the placenta, etc. It seems to me that if he had been obliged to go into the uterus for retained placenta or anything of that kind he would have been going in with gloves that were not sterile. We think that the patient should be properly prepared by a nurse or an assistant with sterile gloves, or if the operator himself must do it, that he will, after the patient is prepared, take his gloves off and put on another pair for the delivery. Then if it becomes necessary to do anything further after the delivery he should change the gloves again. I speak of this only because in an institution like the Sloane we expect the best technic, but as Dr. Dickinson said, this criticism is only among friends, and I hope that both Dr. Cragin and Dr. Voorhees will accept it in that way.

"There is only one other point that I want to talk about. We went around the hospital afterward and asked all sorts of questions

about the treatment of nipples, etc. In the matter of the care of nipples we have tried silver nitrate, argyrol, ichthyol, and practically everything else for cracked nipples. I have recently had my attention called to lead nipple shields, but I had never heard of them. I must say that I have never tried anything for cracked nipples that is comparable to the use of lead nipple shields. They have given in many cases good results where nothing else has succeeded."

DR. ROBERT L. DICKINSON.—"I regard Dr. Voorhees' modification of the Champetier de Rives' bag as a very important one. It is durable, strong and you can pull on it. Why, when we introduce the bag do we not put the *patient in the knee-chest position?* The vagina balloons. A tenaculum is placed and you drop your bag controlled by the eye into a cervix which is partly open. I ask for a trial of this knee-chest position of mine for bag cases if the woman isn't too big and clumsy."

DR. JAMES D. VOORHEES.—"I thank the members of the Society for the kind attention they gave me this afternoon.

"In regard to Dr. Brodhead's remarks about inserting the bag by touch, I would say that I almost always practise this method. I depress the perineum so far behind that the bag, and then forceps, can be introduced without touching anything before both are brought close up to the cervix. I only use the speculum and expose the cervix, in cases where the cervix is very elusive and it is hard to find the external os. In such cases the cervix must be grasped by a volsellum or tenaculum and pulled down before inserting a bag. I think that this practice often tears the cervix, consequently there is another site for possible infection especially in a primipara where the labor is apt to be prolonged.

"Dr. Brodhead criticised the management of this multipara at the hospital. The obstetrician who did the work is one of our internes there. I don't think he has had very much experience in the delivery of cases and it may be that he was a little bit rattled.

"Our practice is to hold the baby up by the feet so as to let the mucus run out of the mouth and nose. In cases where the mucus still persists, the mouth is wiped out, sometimes by a nurse, and if the nasal passages are plugged up as well, we then put a piece of gauze over the mouth and blow through, clearing the passages out in this way.

"Dr. Brodhead criticised the man for only washing his gloves in an antiseptic solution after attending to the baby. I think that if there had been any operating to be done, any repair of the perineum or intrauterine manipulation—in other words if it were necessary to clean out the uterus of retained placenta or membranes, the man would have changed his gloves in order to carry out this procedure properly.

"He also spoke of the care of the nipples. We all know that all kinds of medication and treatment have been advocated to cure cracked nipples. I have used lead shields. Sometimes I think they are of use and sometimes I think they are not. The main point in the care of the nipples is a proper watching of the patient

by the nurse in the beginning. I think most of the harm is done in the first two or three days before there is any milk in the breast, where you have a vigorous baby who nurses too strenuously and pulls the nipple all to pieces. The patients themselves are partly responsible for trouble with the nipples because they are afraid the baby won't get enough to eat, so to speak, if a shield is used so they keep the baby to the breast when the nipple is tender. They don't mind a little pain or discomfort more or less. It is then that the damage is done. I have a standing rule at the hospital that in the early days of nursing the patient should use a shield on the nipples until the milk comes in. In this way injury to the nipple is prevented. When the nipples are cracked, you can try almost anything without any result. These cracks will not clear up until the nipples are given a rest for twenty-four hours. In this way the cracks and excoriations become covered up by strong healthy skin and the patients can then nurse again. In cases where this rule is not observed we are liable to have some dangerous complications later on.

"I have just had an obstetric case in conjunction with a baby specialist. He tried to treat the nipples. I went in to see the patient one day and found the nipples as black as ink. I found he had ordered a strong solution of nitrate of silver to be applied to the fissures, but instead of doing so the nurse had applied it to both nipples, more or less cauterizing them. Four or five days after this the woman had a little caking in each breast. A week later these masses broke down and I had to open a deep-seated abscess on either side. In the proper treatment and care of the nipples and breasts, it is very unusual to have to do anything of this sort.

"In regard to Dr. Dickinson's suggestion of inserting the bag with the patient in the knee-chest position: I think this position might be tried. The only objection I can see is that the presenting part is liable to drop away from the cervix and would be high up above the bag.

"Dr. Grad asked whether we performed venesection in cases of eclampsia at the Sloane Hospital. We have in times past done venesection, but I must say (and I think Dr. Cragin agrees with me) that we have never had any beneficial results from the operation. I think the loss of blood sometimes does more harm than good. We reduce the pressure in cases in which it is very high, by large doses of chloral, 30 grains every four hours by rectum. Sometimes we give morphine. We also use veratrum viride occasionally in certain cases where the high pressure persists. This drug requires careful watching.

"Dr. Maroney asked me if I can determine the cases where we are liable to meet with poor enervation—uterine inertia. I wish someone could tell us something about this point. The greatest bugbear of the obstetrician is the case with poor pains. In these cases we give quinine as an oxytocic without much success. We sometimes use strychnine to increase the pains. Sometimes these drugs help and sometimes they don't. It is impossible to tell beforehand whether a woman is going to have strong pains or not. In the hot-

house type, neurasthenic society women, we don't expect to get strong pains. These women are brought up without any responsibility. They are worried over by their very, very anxious mothers. No wonder they have inertia.

"Dr. Pinkham asked me to describe the method of tying the cord in this particular case at the hospital. We isolate the arteries, tie each separately, then pass the tape around the whole cord, tying again. There is very rarely any secondary hemorrhage from the cord by this procedure."

DR. EDWIN B. CRAGIN.—"I would like to say a word along the line of Dr. Voorhees' answer to Dr. Brodhead's remarks. I should hate to have a wrong impression go out in regard to a staff man going into the uterus with a glove which he had failed to change. Not only is he obliged to have on a fresh sterile glove before going into the uterus, but he must put on a sterile rubber sleeve; so he not only has a sterile glove, but a sterile sleeve, reaching to the elbow as well, before going into the uterus."

DR. GEO. H. RYDER presented some

#### OBSERVATIONS UPON THE USE OF NITROUS OXIDE IN OBSTETRICS.\*

##### DISCUSSION.

DR. GEORGE L. BRODHEAD.—"Dr. T. H. Cherry, my colleague at the Harlem Hospital, recently tabulated eighty-four cases in which nitrous oxide was administered. He found that the blood pressure was raised slightly in three cases only; that the fetal heart was not altered in any case. There was complete analgesia in 29 per cent. of the cases; moderate analgesia in 69 per cent. of the cases. In other words, there was more or less effect in practically all of the cases. Three infants were asphyxiated, and in all of these cases the cord was about the neck, but all three of the babies were quickly resuscitated. There was no postpartum hemorrhage in any case. This may be due to the fact that at Harlem Hospital our routine is to give ergot at the end of the second stage immediately after the birth of the child."

DR. ROBERT L. DICKINSON.—"There was one thing which was not mentioned to-night, and that is the fact that nitrous oxide can be given for complete anesthesia in sewing up the perineum without relaxation of the uterus and without causing bleeding while relaxation and bleeding is a very real chloroform danger. It is a fashionable and popular thing, in society this nitrous oxide. The better class of anesthesia devices like the Heinbrink and the Gwathmey, which we use at the Brooklyn Hospital, answer every expectation. There is one great objection about the cheap devices and that is in the rush of gas into the bellying bag alarms the patient. The more complicated devices act quietly in this respect."

\* For original article see page 981.

## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF PHILADELPHIA.

*Meeting of February 1, 1917.*

*The President, FRANK C. HAMMOND, M. D., in the Chair.*

DR. NORMAN L. KNIPE presented the reports of two cases:

### (1) COMPLETE INVERSION OF THE UTERUS AND VAGINA FOLLOW- ING LABOR.

Inversion of the uterus alone, is described as one of the rarest complications of labor. Winckel did not see a case in 20,000 labors. In the Dublin Rotunda only one case occurred in 100,000 labors, and in the Vienna Maternity there was not a single case in a series of 250,000 labors.

Inversion of the uterus *and* vagina, or inversion with prolapse, as it is often called, is said to be the most unusual type of these rare occurrences. I should imagine from what I could glean from the literature on the matter, that it may occur once in say 300,000 labors.

The case to be described is of this most unusual variety and I am reporting it simply to add to the number of such cases on record.

With the exception of its occurrence there was nothing that was especially interesting in the case. I saw it in consultation within thirty minutes after it occurred and it terminated fortunately.

The case was as follows:

A woman of thirty-eight years. One child born four years ago. The present confinement was not difficult, lasting about eight hours. The inversion occurred spontaneously, immediately after the birth of the child; no traction was put on the cord; no forceps were used. When I saw the case, the uterus was completely inverted and appeared as a body the size of a cocoanut, outside of the vulva. The placenta was still attached. The patient was profoundly shocked, although I do not believe she lost an excessive amount of blood. Pulse hardly perceptible, extreme pallor and leaky skin.

The placenta was shelled off without much difficulty and then by careful manipulation the uterus was everted by exerting pressure in the bend or crease caused by the inversion. No anesthetic was necessary because the patient was too shocked to be very sensible to pain.

After the uterus was returned to its normal position, there did not seem to be any tendency toward a recurrence of the inversion or any bleeding, so that the uterus was not packed because of the possible increased danger of sepsis. The patient was given as much of the usual after treatment for bleeding and shock, as is

possible in a private house; hypodermoclysis and enteroclysis, application of heat, hot drinks and stimulating hypodermic medication. She made an uneventful recovery.

(2) A CASE OF DICEPHALUS TETRABRACHIUS DELIVERED BY  
CESAREAN SECTION. X-RAY AND PHOTOGRAPHS.

Foster and Fisher classify the dicephalic monsters into five subdivisions, depending upon the number of arms and legs they have. Their classification is as follows:

Dicephalus dibrachi-  
us,  
Dicephalus tribrachi-  
us tripus,  
Dicephalus tetrabrachi-  
us dipus,  
Dicephalus tetrabrachi-  
us tripus.

A brief description of the dicephalic monstrosities answers so well for this particular case, which conforms perfectly to the general type, that I can do no better than to quote from Hirst and Piersol's "Human Monstrosities" which remains the most authoritative work on teratological abnormalities.

"In the highest degree of the dicephalus tetrabrachius dipus and tripus, there is a pretty complete duplication of internal organs and the two halves of the composite body are distinct individuals in thought, volition and disposition; and each brain controls the movements of the corresponding half only of the body. There are four lungs, two hearts (perhaps in one pericardium), two stomachs, two intestinal canals to the colon or even to the rectum, two livers (though they may be joined), and two gall-bladders. There may be four kidneys but more likely three, in which case the intermediate organ is small. In the female the uterus is double but the external genitalia are single. In the male, the two bladders are emptied at different times, through a common penis. There are two complete spinal columns; the coccyges converge toward one another and the sacra are united by a bony union. The two lower limbs have no coördinate action, each being subject to the will of the corresponding individual. Hence locomotion is awkward and almost impossible."

This interesting case was admitted from our Southeastern Service, where the patients are delivered at their homes, by the students of the University.

The history of the case is as follows:

Mrs. O. W., a colored woman, thirty-nine years of age; two previous children; previous labors described as difficult; no abnormal family history.

Labor pains commenced on the morning of July 15. In the afternoon, a student in charge of the case, delivered the woman of a normal appearing stillborn child. He examined the woman and thought that she was about to give birth to a twin child. After waiting a reasonable time without result, he called Dr. Janvier one

of our consultants to assist in the case. Dr. Janvier performed version on the child, but was unable to deliver it. He recognized at once that he had some abnormality to contend with and sent the case to the University Maternity. The residents on duty at the time also tried to deliver the child without success. The case was then referred to me.

Upon examination I found that the child was born to the buttocks, but there seemed to be some obstruction at, or overgrowth of the shoulder. The woman was stout and difficult to examine.

Dismemberment was considered but was discarded in favor of Cesarean section, by which this monstrosity was delivered.

Notwithstanding all the manipulation and examinations which the woman was subjected to, I considered that it was safer not to risk the additional shock of a hysterectomy. The peritoneal cavity having been previously walled off with gauze packing, the uterus was delivered, carefully swabbed out with tincture of iodine and closed up by the method advocated in our service—layer catgut suturing with the addition of four interrupted, nonabsorbable Pagenstecher sutures.

The patient ran a little temperature for a few days but made a splendid recovery.

The second case of dicephalus was admitted to the Philadelphia Lying-in Charity Hospital in 1901. She was a negress aged twenty-one years, a primipara. She had been in labor for some time, and her child was dead. The uterus was irregular in shape, and a head was presenting, well engaged in the pelvis. As the labor did not advance, I displaced the head, introduced my hand into the cavity of the uterus and, to my surprise, found that two heads were joined to a common trunk. The delivery was accomplished by decapitating the presenting part and then performing podalic version. The patient recovered.

#### DISCUSSION.

DR. G. M. BOYD.—The two cases presented by Dr. Knipe are of unusual interest. I show you a rough sketch of a case of complete inversion of the uterus and vagina and also a photograph of a case of dicephalus dibrachius, a double-headed monster differing from Dr. Knipe's case in that it has two arms and two legs. Both of these cases have already been reported before this Society. Complete inversion of the uterus and vagina is an extremely rare accident.

I have seen in consultation several cases of incomplete inversion of the uterus alone, but in this case both the uterus and vagina were prolapsed. The patient was a multipara, and was admitted to the Medico-Chirurgical Hospital, February, 1912. Suddenly, after a simple forceps operation performed by her attending physician, while making pressure over the uterus for control of the hemorrhage, the uterus and vagina, with the attached placenta, became completely prolapsed. Her physician separated the adherent placenta and attempted to replace the inverted uterus but, failing in this,



she was referred to the hospital. The patient was admitted five hours after her delivery, considerably shocked from loss of blood, and on examination a pear-shaped mass, the uterus, protruded from the vagina. Attempts were made without avail to replace the organ by taxis, and it was then necessary to open the abdomen, to dilate by pressure the contraction ring. This revealed a crater-like excavation in place of the rounded uterine body. After relieving the point of constriction, we were able to reposit the uterus by pressure from below. The patient made a good recovery.

DR. GEORGE W. OUTERBRIDGE.—The case is interesting from the standpoint of treatment. I should like to ask whether the child was alive, and whether any other mode of delivery was considered or would have been possible?

DR. JOHN A. MCGLINN.—I have had no experience in the latter type of case. The statistics quoted by Dr. Knipe of complete inversion of the uterus are practically those which I found when reporting my case. Personally, I do not believe the condition is as rare as the statistics indicate. I would ask Dr. Knipe whether in the Cesarean section he used the extraperitoneal route. I believe much harm has been done by the dictum in reference to the fear of Cesarean section in cases which have been examined. I have within the past week done two Cesarean sections in cases handled outside. In these cases I did not do the extraperitoneal Cesarean section and did not take the uterus out. Both patients are making excellent recoveries.

DR. JOHN M. FISHER.—I have had two cases of inversion of the uterus. One occurred in the practice of a down-town physician many years ago. I was called at midnight and saw the woman about three hours after delivery. We had no special difficulty in reducing the uterus. The case was in a private house and was attended by a midwife. Many examinations had been made, the surroundings were unhygienic and the woman developed sepsis. Hysterectomy was at that time considered the proper treatment. This was done and the woman died. The other case I saw three years ago. There were no special points in connection with the history. The uterus in this case was also easily reduced and the woman made a good recovery.

DR. GEORGE ERETY SHOEMAKER.—I recently saw statistics which give the number of cases of inversion of the uterus as one in 123,000 labors. It is difficult to tell just how often it does occur in unreported cases. I happen to have seen two. One was operated upon by another man and vaginal hysterectomy was inadvertently done. The other occurred in my own practice and I intend to report it shortly. I did the Spinnelli operation of splitting the uterus and turning it right side out. The result was most satisfactory.

DR. KNIPE, closing.—It is to be regretted that more cases of inversion of the uterus have not been reported, in order that the statistics on the accident might be more reliable; I have heard of a number since writing this paper, which have not been recorded. In my case I did not have any difficulty in reducing the uterus. The

shock resulting from the accident and the hemorrhage which occurred were the most important symptoms to combat.

I agree with Dr. McGlinn that there should be a reversal of our ideas concerning the danger of infection following Cesarean section in cases which have been merely examined. I have done only two clean Cesarean sections; all others have been presumably infected and I have not lost a single case. All the women had been examined repeatedly or delivery by forceps attempted.

Dr. Piper has just corrected me, saying that he does not think that the child was born quite to the umbilicus; it was born at least to the buttocks. I thought Cesarean section safer than craniotomy on the after-coming head, even though I had to draw the child back through the vagina, because I did not know the kind of malformation I had to deal with.

I believe much of the danger of sepsis following Cesarean section depends upon the manner in which the uterine wound is sewed up. I believe the method suggested by Dr. Hirst with the insertion of four interrupted sutures of nonabsorbable Pagenstecher thread in addition to the layer catgut suturing, has much to do with the wound holding securely. The ordinary method of using catgut alone, which is quite elastic, is not altogether safe because of the fact that the uterus is expanding and contracting continually and the danger of seepage through the uterine wound is thereby increased. I have found a solution of 5 per cent. thymol and 60 per cent. alcohol for swabbing out the uterus more efficacious than iodine. This should be done carefully in all cases presumably infected before closing the uterine wound. From such cases I think we may learn the value of continuous irrigation. If in cases of Cesarean section with temperature occurring, the uterus should be irrigated very frequently instead of once a day, there would be little danger of seepage of infection through the uterine wall; all drainage would then occur through an open cervical canal unobstructed by blood clots and debris.

DR. WALT PONDER CONAWAY reported

#### A FATAL CASE OF BICHLORIDE POISONING FROM VAGINAL ABSORPTION.

The following case from my wards in the Atlantic City Hospital, I consider of sufficient importance and interest to report before this society.

Blanche W., white, aged twenty-three years, a waitress, was admitted to the gynecological ward on August 17, 1916, at 8.30 A. M. suffering from enlarged vulva, inability to urinate, severe cramp-like pains in the lower abdomen, vomiting, headache and diarrhea. The history of the case which she gave, and which was corroborated by her girl companion, was to the effect that on the previous night, after an all night debauch with two male companions, she was advised by her girl friend to use a bichloride tablet to prevent conception; but that no instructions were given her as to the correct method of its administration. She inserted the tablet (which she

said was white and somewhat larger than a headache tablet) in the vagina, pushing it up as far as she could with one finger. This was about 4.30 that morning. She tried to sleep but found this to be impossible on account of a burning pain in the vagina, which increased in severity until a few hours later when she was sent to the hospital.

On admission to the hospital the patient had a subnormal temperature, pulse rapid but of fair volume, respirations slightly increased, and there was considerable headache, nausea and vomiting. The vulva was considerably swollen and painful, which rendered catheterization almost impossible. The urine was scanty, high colored and already showed evidence of acute nephritis. The symptoms all increased in severity and the next day there was a bloody discharge from the bowels with persistent retching, vomiting, headache and abdominal pain. On the second day there was a pronounced thirst, dryness of the buccal mucous membrane, severe headache and a beginning suppression of urine. The temperature was subnormal and the pulse rapid, thready and weak. Intravenous infusions of sterile water, enteroclysis as often and as much as could be retained, lukewarm baths and hot packs were used. Albumin, milk, milk of magnesia and alkaline diuretics were given by mouth. The vulva became more swollen and there were many eschars on the vaginal walls and on the labia. These began to slough on the fourth day. Morphine hypodermically was used for the pain. The symptoms all increased in severity on the third and fourth days, and on the fifth day she succumbed to uremic toxicosis with convulsions. A postmortem was refused by the family.

In a paper read before the Association of American Physicians in May, Lambert called attention to the tremendous increase in the number of cases of poisoning from bichloride of mercury. Sabbatani states that the same is true of Italy, and that during the past few years the number of cases of fatal poisoning from mercuric chloride is progressively increasing.

From 1903 to 1912 there were in Italy 4993 cases of fatal poisoning, and of this number 38 per cent. were due to mercury. Sabbatani is of the opinion that this number is below the actual facts, as probably the death from bichloride was in some instances ascribed to other causes. He estimates that if we assume that if only one in three or four dies, the number of cases of poisoning would total 6000 or 8000 and in the ten years in question, in a population of 33,000,000. He states that the average of nearly a thousand cases a year has been exceeded in the past two years, and that the number of suicides by this means has increased from twenty in 1899 to 309 in 1912. In his opinion this great increase in poisoning from bichloride is due to the fact that the drug is so easily obtained. A law should be passed prohibiting the sale of tablets containing bichloride of mercury, except on a physician's certificate; and even then, as Sabbatani suggests, the number should be limited so that the amount will be used up soon and none of the tablets are left over.

Witthaus\* studied 231 cases between 1879 and 1896. One hundred forty-one were due to irrigations of vagina and uterus and 48 of these were fatal. Of the 231 cases, 172 were neither obstetric nor surgical. Of these, 70 were accidental, 47 suicidal and 27 homicidal.

I regret that I have been unable to find any more recent statistics bearing on this subject.

#### DISCUSSION.

DR. COLLIN FOULKROD.—Recently in talking to Dr. McCrae, on this topic, he said that both Dr. Lambert and himself had simultaneously hit upon the plan of using alkaline drugs to counteract the toxic effect of bichloride poisoning.

DR. LONG.—Eight years ago I had a case of bichloride poisoning in a dispensary patient whom I directed to take a douche. She did not have a fountain syringe and inserted a  $\frac{3}{4}$ -grain bichloride tablet in the vagina. Two days later she came into the hospital. The vulva was swollen; there was diarrhea with pus in the stools and swelling of the glands of the mouth and neck. She lived about eleven days in which time she passed 2 ounces of urine. I also had an instance of bichloride poisoning in a private patient to whom the trained nurse gave a douche of bichloride solution and also an enema. The patient soon began to have cramps in the abdomen, loose bowels with the stools mixed with pus. The neck was swollen about the jaws and the lymphatic glands of the mouth and tongue and the patient died in about nine days.

DR. STEPHEN E. TRACY.—I have not seen a case of bichloride poisoning by absorption from the genital tract. About three weeks ago, a doctor called on the 'phone and asked if I would have admitted to my service at the Stetson Hospital a case of abortion. I told him I would. He then stated that the patient had been using bichloride douches and showed some evidence of mercuric poisoning. The ambulance was sent for the patient, but the mother would not allow her to go to the hospital. Her condition becoming more serious, she was later sent to another institution and died the following morning of bichloride poisoning. I was interested in what Dr. Foulkrod said about the use of alkalies in bichloride poisoning. My colleague, Dr. Odenat, in the Medical Department at the Stetson Hospital, has saved two out of three cases of bichloride poisoning and he did it chiefly by the use of alkalies administered by the mouth, under the skin and enteroclysis by the Murphy drip.

DR. JOHN A. MCGINN.—I think it is important to ask why the bichloride douche is used? We cannot hope to accomplish anything by it in the strength in which it is routinely given. It does not sterilize the vagina and does no more than the normal salt solution. I think it important that the Obstetrical Society should discourage its use.

\* Witthaus and Becker. *Medical Jurisprudence, Forensic Medicine and Toxicology*, N. Y., 1896.

DR. DANIEL LONGAKER.—At the Kensington Hospital for Women we have discontinued the use of bichloride even for irrigation in our obstetric work. (Of course, the use of the douche in present up-to-date obstetric practice is obsolete.) Our patients do just as well with normal salt irrigations and convalescence without morbidity in the overwhelming majority of cases.

DR. LIDA STEWART-COGILL.—A case of bichloride poisoning was sent into the West Philadelphia Hospital for Women several years ago during my term of service. The patient had been advised by a neighbor to use a bichloride tablet in the vagina, in the same manner as in one of the cases discussed here to-night.

The woman when brought in had delirium, diarrhea, bloody stools, and great sloughing of the tissues of the vagina and vulva, she died in a few days.

I should like also to state that both at the Woman's Hospital and the West Philadelphia for Women I have discontinued the use of bichloride solutions for hands, douches and irrigations.

DR. JOHN M. FISHER read a paper on

#### THE RESIDENT PHYSICIAN IN HIS RELATION TO OPERATIVE GYNECOLOGY.\*

##### DISCUSSION.

DR. G. M. BOYD.—Dr. Fisher brings before us an important subject for consideration, the resident physician in his relation to gynecology. In the majority of Philadelphia hospitals the interne remains but one year. This fact makes it necessary to change his service very frequently, so that it is difficult to give him all the practical training we desire. We who work in the maternities feel that the interne must assume considerable responsibility. If efficient he assists in or performs the forceps operation, and does repair work under the guidance of his chief. While we wish to make the service attractive we must follow a conservative course else he will not appreciate that it requires a long training 'to become skilful, and his lack of knowledge may make him a dangerous man in the community. I believe that we will serve him best if we devote our time chiefly to diagnosis, and impress upon him the necessity of careful history-taking.

DR. CHARLES B. REYNOLDS.—While listening to the reading of Dr. Fisher's paper I recalled two cases of supposed incomplete abortion sent into our hospital recently. In one case there was a history of the uterus having been curetted, irrigated and packed with gauze. Thirty-six hours later she had a chill and elevation of temperature. An examination at this time revealed a retained and partially decomposed placenta which was removed manually. The second patient had been curetted and the vagina packed hurriedly to control the hemorrhage. On removal of the packing twenty-four hours later the placenta was found in the upper portion of

\* See original article page 1001.

the vagina and presented several rents in the fetal surface caused by the curet. I feel, therefore, that Dr. Fisher is entirely correct in his views regarding the curet.

DR. GEORGE ERETY SHOEMAKER.—I think the matter deserves careful consideration. Obviously there are two sides to the question. The physician in charge of the hospital service has a duty to perform to his patients as well as the duty to the resident. Just at present there appears to be an effort made to see that the resident gets more attention than the patient. Always to be borne in mind is the fact that if the resident be allowed to do operations he should first learn to do them in the standard way. The operation should be supervised and the method which he adopts should be the preferred method of the experienced man. I have sometimes found men who have had in their minds the desire to "try something," who if allowed to do an operation will try a method which is not under approval. We should certainly try to give the men a fair opportunity, but we should not be carried away with the idea that we are in the hospital primarily to teach young men and try to turn them out in three months as finished operators. We are there primarily to do the patient the most good.

DR. STEPHEN E. TRACY.—I was much interested in Dr. Fisher's paper and practically agree with Dr. Shoemaker that the resident should have every possible opportunity to learn the work. I do not quite understand what Dr. Fisher means by minor gynecology. To me there is no such thing as minor surgery; it is all major surgery. A person may lose his life as readily from an infection in a small abrasion as from an infection in the abdominal cavity as the result of an operation. More skill and good judgment are required to do proper plastic work than to perform a simple abdominal operation. I do not think it would be wise to make rules as to what operations a resident should do on a gynecological service. The chief should select the cases and decide on the operative procedure for the particular patient.

DR. NORMAN L. KNIPE.—I think that sometimes the fault lies with the teacher or operator. I have come in contact with many residents and know that there is a feeling that the operator is sometimes not willing to spend the time to stand back of the resident and show him repeatedly if necessary, how an operation should be done. As a consequence of this, when an occasion arises, a curetment for example, at which it is impossible for the Chief to be present and he telephones to the resident to go ahead, the resident will often try to do the necessary operation when he may not have had the opportunity to handle a curet previously. If the operator would spend more time in showing the resident and allow him to do some part of the work under supervision, he would realize that the operation is not as easy as it sometimes looks to be. Yet it is a question in my mind whether even the present inadequate teaching received by the residents is not preferable to no teaching at all. For instance, in a town close to Philadelphia there is a young man who graduated from the University of Pennsylvania who is doing all kinds of major

surgical work. He never assisted anyone; has never been a resident in any hospital of standing, yet he is doing major surgery whenever he gets the chance. He is doing unskilful surgery and dangerous surgery and does not seem to realize it. To control such a situation, residents in hospitals should be shown how to do this work and should be given an opportunity to do it under supervision so that they might acquire a proper appreciation of their responsibility for the life of their patient.

DR. GEORGE W. OUTERBRIDGE.—Two points of very great interest appeal to me. The first was brought out by Dr. Knipe, the very great difference existing when you start to operate between the operator and the assistant's side of the table. It looks very easy from the assistant's side. As Dr. Knipe has said, many of our internes have never known other than that position. If they had a little chance of being on the operating side they would realize how quickly they can get into very deep water, and would not be in such a hurry to jump in themselves when nobody is at hand to help out. The matter also depends somewhat upon the character of the service in the individual hospital; Dr. Fisher is of course speaking of the average one-year hospital, where the residents change services every two or three months. Hospitals vary greatly in this respect; when I was resident in the University Hospital, for instance, the gynecological service was five months, and a man came to it at the end of his hospital course, after seven months of surgery. A service of this sort necessarily gives a better foundation than when a man is passed from one service to another every two to three months, and it seems to me that this factor should be taken into account in determining how much the resident should be allowed to do.

DR. JOHN A. MCGLINN.—I must plead guilty to having written this letter to Dr. Fisher. There was placed in my hands a letter from Dr. Baldy criticizing the training given the residents at St. Agnes Hospital. I wrote Dr. Baldy admitting that the service was not as complete as it should be. I then wrote a series of recommendations which I felt sure if carried out would give the residents a training which could not be excelled in any hospital in the city. All must realize that the hospital is going to be a part of the medical education of the resident physician. The Medical Examiners' Board has the power to accomplish this and will enforce it. If the methods of teaching the residents are not corrected the hospitals will not be recognized as first-class hospitals. So far as allowing the resident to do minor gynecology, which as has been said, may be a misnomer, I feel that it is much better to allow him to do such work under the observation of the chief or assistant chief, because he is going to do the work after he graduates and unless he has this opportunity before leaving the hospital he will never appreciate the difficulties of the work. As Dr. Outerbridge has said, from the assistant's side of the operating-table he has no chance to estimate the difficulties of the so-called minor operations, difficulties which will arise not only in major but in minor surgery. We have a rule that the resident shall be the first assistant at all operations. This is a rule which I

absolutely disapprove of; it is of no benefit to him and gives him a false idea of surgery. When I recommended the bringing in of assistants from outside the hospital not a member of the staff would back me up, insisting that the resident physician should be the first assistant because it was the established precedent. I tried to upset this precedent but could not. Take Dr. Fisher who, to my mind, does as beautiful plastic work as any man I have seen. When he does a curetment, he takes the graduated bougies and passes them in like an artist. A resident who sees the ease with which this is done will undertake the work lightly and will pass them right through the uterus. If, however, Dr. Fisher would stand by the man, direct and explain the work, he would appreciate that the operation was not so simple as he would think from simply observing Dr. Fisher manage the case. On the other hand, there are certain types of cases which a man in the country has to handle alone, for example, incomplete abortion. It is a crime to allow a man to go out from his hospital training without being trained to empty the uterus. We need not as gynecologists fear that we have to throw a war zone about ourselves to protect us from the general practitioner.

DR. W. H. LONG.—Some time ago I had the pleasure of hearing Dr. Baldy speak upon the status of medical education in Pennsylvania. He stated that while Pennsylvania had been the center of medicine for a good many years it had stood lowest in the qualifications to practise medicine. He further stated what the Examiner's Board had done to place Pennsylvania on the high plane which it now occupies. As a general practitioner, I cannot agree with Dr. Fisher's paper. If Dr. Baldy is going to carry out the examinations before the State Licensing Board as he indicates men cannot pass these examinations except by a change in the method of teaching. I agree with Dr. McGlinn that the time has come when a year in the hospital is a part of a man's medical education. Dr. McGlinn spoke of the art and skill with which Dr. Fisher passes the graduated bougies. A man before passing a graduated bougie measures the depth of the uterus with a uterine sound. No man in general practice or resident physician of any first-class hospital and who has seen graduated bougies used is going to put them through the uterus.

It is up to the man holding the position of chief to see that a man thoroughly understands how to do this work. In general practice a man is constantly meeting with cases of incomplete abortion and he must empty the uterus. He may find that he cannot have his patient admitted to the hospital, and the operation must be done at home. I cannot agree with Dr. McGlinn that emptying the uterus is one of the most serious operations of gynecology. If the resident is not taught the general principles of a plastic operation he is unable to look after the acute tear which every young physician meets.

DR. COLLIN FOULKROD.—I feel strongly on this subject and do not know where to begin. Dr. Nicholson recently asked me to look after two cases in the maternity wards which had been sewed up by a resident. The resident had been allowed to sew these primary tears because the State Board of Medical Examiners had decreed



that each resident should have a certain number of maternity cases. It is true the Board did not say that each resident should sew those cases. The resident assumed that he must take care of the patient and did not notify the chief. This is the fault of the effort to advance the resident and will no doubt be corrected. The mucous membrane had been sewed and no deep sutures taken, leaving a cavity large enough to insert a good-sized sponge in the rectovaginal space. We have made a rule that *all our tears must be left for secondary repair in order to protect our patients and our reputation*. I do not believe we shall realize our ideal for the resident until we are able to control what he will do in the absence of the physician in charge. We have always been in the position of fearing that the resident is going to do something wrong. In connection with what Dr. Outerbridge has said regarding the difference between the two sides of the operating-table, I remember well my experience at a time when Dr. Willard gave me my first appendix to operate on while he helped me. This taught me very many things. Time should be given to the resident and he must understand that the teacher will be on hand to help and to teach him.

DR. DANIEL LONGAKER.—I am in entire sympathy with the last speaker. While I believe in "iron clad" rules we must have sympathetic coöperation and show the resident how to do as much as possible. No interne can learn how to do a forceps operation unless you show and guide him in every step of that procedure. The same thing is true in regard to the repair of the perineum. If you are willing to spend the time you will have the coöperation of the interne and he will not do things behind your back.

DR. FISHER, closing.—I am much gratified that the paper has elicited such a lively discussion. From many of the remarks made it would appear that the principal thing to do is to teach the resident how to do things. It strikes me that in gynecology the principal thing is to teach the resident how to *know* things regarding something to be done. In the vast majority of hospitals the resident remains for a period of one year during which time he rarely gives more than two months exclusive service to any one department. but more often his interests and professional attention must be shared by two or more departments. Even though you have him every day of those two months all he will have gained at the end of that time will be an indifferently trained tactile sense and a minimum knowledge, therefore, of gynecologic diagnosis. If a man starts to practise gynecology with a minimum education in pelvic diagnosis, the curet above everything else is the most dangerous instrument that can be placed in his hands. It is so easily used and he simply uses it for what he can see and not for what he cannot see and often fails to find. One drop of pus in a tube is capable of as much mischief if unduly irritated as a dram would be under like circumstances, and yet the diagnosis of the former may tax the tactile sense of the most experienced specialist and escape his detection even, so that not infrequently his opinion is based on nothing more than the clinical history, localized tenderness, or slight resistance

of the vaginal vault. To do a curetment in such a case may mean that the smouldering embers of a quiescent salpingitis will be stirred into activity with resulting peritonitis and its retinue of widespread destructive evils. Gynecology is as much of a specialty as is eye surgery and should be handled with equal care. What resident leaving a general hospital to-day feels that he can do a cataract operation, iridectomy and the various other operations on the eye which he has seen done? So far as gynecology is concerned, the unseen, and often unfelt, conditions above the vaginal vault are of more importance than uterine conditions that can be seen. A discharge from the uterus is not always an indication for curetment. Sometimes a resident learns just enough of supravaginal diagnosis to enable him to recognize gross pathologic lesions such as fibroid tumors, ovarian cysts, or large inflammatory masses, and yet some well-nigh impalpable pathologic processes are of greater importance diagnostically and surgically. To-day at the Jefferson Hospital a patient was sent in by a man who professes to know something about gynecologic diagnosis with instructions that all that was needed was a dilatation and curetment. On examining this patient I detected a limited mobility of the uterus. With such limitation I considered that there was disease above the vaginal vault fixing the uterus. A curetment was done, but the abdomen likewise was opened to ascertain the nature of the disease of which the uterine discharge was merely a symptom. Gynecology is a specialty and I do not think that within the two months in this service the interne should be encouraged to operate to such an extent that upon leaving the hospital he feels justified to do even a curetment in utter disregard of his shortcomings as a diagnostician. He should learn enough of gynecology to make diagnoses of gross pathologic lesions and a sufficiently near diagnosis in other cases to avoid the dangers of the curet. If an important operation is to be done, he should if possible have the opinion of an expert before such a move is attempted, and the fact that a curetment is an independent procedure is a very important operation should not be forgotten. Gynecological conditions, as a rule, are not of immediate danger to the life of the patient. Even inflammatory conditions in the pelvis become isolated from the rest of the peritoneal cavity by the exudate thrown out. An inflammatory condition developing below the pelvic brim is entirely different from one above it. In the former there is no necessity to rush into an operation and with rare exceptions there is time to send for, or send the patient to a man of experience. Are men leaving our general hospitals doing all sorts of eye and orthopedic operations, and is the average ex-resident able to do a mastoid operation? A man is less fitted to do a curetment when he cannot make a diagnosis of conditions above the vaginal vault than he is to do a mastoid operation. I will admit there is some difference of opinion even among experts concerning the treatment of abortions. I do not think it necessary to curet every incomplete abortion, in fact I resort to the curet very rarely and aim to avoid it in infected cases especially. In some cases

it is necessary to wait only a few days when the contents of the uterus are discharged spontaneously. In other cases simply the insertion of the finger will complete the abortion. Those using the curet indiscriminately in these uteri are the men who stir up trouble. You should treat these cases as you would any other acutely infected wound, secure good drainage by the least possible traumatism and avoid poking or scraping. I am confident that in 100 cases of infected incomplete abortions in which the curet is not used more would recover than in the same number in which the curet and forceps were employed. While admitting possible errors of judgment in a few cases by the former practice, in my opinion, the dire results that often follow the latter method are appalling by comparison.

DR. JOHN A. MCGLINN reported two cases of

PERFORATION OF THE UTERUS WITH INJURY TO THE INTESTINES IN  
ATTEMPTS TO COMMIT ABORTION.

Instances of perforation of the uterus by instruments in attempts to commit an abortion are sufficiently rare to be interesting.

CASE I.—A young married woman pregnant two months, desired to terminate the pregnancy. Seeking advice as to the best means to accomplish her purpose she was instructed by a woman friend to get a small hook, insert it into the uterus and drag the embryo out. She accordingly made a small hook by heating and bending the end of a long hat pin. She inserted the instrument into and through the uterus and started to pull the embryo out as she had been instructed. Severe pain and bleeding followed this procedure. Becoming frightened, she confessed to her husband who took her to the hospital. The physician in charge removed the hat pin and contents of the uterus. On exploring the uterus, he found a rent in the posterior wall through which projected a knuckle of small gut which was torn across transversely. On account of the injury to the gut, no attempt was made to restore it to the peritoneal cavity. The cervix was packed with a sterile gauze and I was asked to see the case.

When I saw the patient she presented a moderate degree of shock. Immediate operation was advised. A median abdominal incision was made and the incarcerated gut drawn out of the rent in the uterus. There was no evidence of gangrene of the gut so a simple repair of the torn gut was made. On account of the danger of infection from the manner in which the injury was made, it was decided best to remove the uterus instead of repairing the injury in its wall. A hysterectomy was accordingly done. The entire operation lasted less than thirty minutes, was practically bloodless and she apparently suffered no added shock. There was no evidence of peritonitis at the time of operation so the incision was closed without drainage. She made a good immediate recovery from the operation and we felt sanguine that her recovery would be com-

plete. She died, however, four days after operation. At no time did she show any evidence of peritonitis or other infection. Her temperature never went above normal. Neither were there any indications of secondary hemorrhage. She simply gradually grew weaker and weaker until she died. I am unable to account for the death as a postmortem examination was not permitted.

CASE II.—A young girl illegitimately pregnant sought a way out of her difficulty. The boy responsible for her condition offered her the best means by marrying her as soon as he learned of her condition. This method, however, did not satisfy her family who took her to a doctor to have an abortion performed. She was then four months pregnant. Abortion was attempted by inserting bougies into the uterus. This maneuver caused some pain and slight bleeding but as the uterus had not emptied itself in twenty-four hours the doctor decided to curet the uterus. This he accordingly attempted under ether anesthesia. The patient did not stand the operation well and some unusual features developed during the course of the operation. The patient's condition becoming desperate, I was asked to see her in consultation; no mention, however, of the criminal character of the case was made. On visiting the house I obtained the foregoing history and learned the following additional facts: During the extraction of the fetus with placenta forceps, the abortionist pulled out some tissue which he said he thought was the umbilical cord. This tissue, however, slipped back into the uterus when he removed the forceps. I was asked the size of the umbilical cord of a four months' fetus and countered by asking the size of this umbilical cord. Much to my amazement, I learned that it was about 1 inch in diameter and about 3 feet in length. I asked why he did not pull the entire cord out and was informed that the forceps slipped off after he had gotten 3 feet out. He was informed that the cord was intestines and that the girl would undoubtedly die. I advised that she should be removed to a hospital. The hospital was notified to have the operating room ready for an immediate section and also to notify the proper officials that such a case was coming in and where it was coming from. Both these instructions were carried out. The ambulance was sent for the patient and she was brought to the hospital. She died in ten minutes after admission before anything could be done for her.

At postmortem, a large hole was found in the uterus, the lower abdomen was full of blood and 3 feet of intestines were torn from their mesenteric attachments. And yet sympathy is sometimes expressed for the professional abortionist. For him it is superfluous—he needs it not, only his reputation suffered.

DR. JOHN A. MCGLINN also reported three cases of

#### INTESTINAL OBSTRUCTION COMPLICATING ADVANCED PREGNANCY.

Intestinal obstruction is a rare complication of pregnancy. Very few references to it occur in the literature and the majority of text-books on obstetrics make no mention of it whatever. Williams

states that intestinal obstruction is a rare complication of pregnancy. He has seen two cases. In the first intussusception occurred at the site of a tubercular ulcer, and death followed a resection of the gut; while in the second case obstruction was due to constriction by a peritoneal adhesion in a case of tubercular peritonitis. This was relieved by operation and the patient delivered at term, but died some weeks later from miliary tuberculosis.

Webster very briefly discusses the subject and refers to a case reported by Viun of a woman three months pregnant in whom the obstruction was due to an omental tumor. He removed the latter and  $13\frac{1}{2}$  inches of small gut. The woman recovered and pregnancy continued to term. Webster states that obstruction may occur during labor by a knuckle of gut being forced into a hernial opening.

My own experience consists of three cases. In none of the cases was pregnancy directly responsible for the obstruction.

Intestinal obstruction during pregnancy is an acute surgical condition and calls for early operation. The condition might better be termed acute intestinal obstruction complicated by pregnancy. Pregnancy complicates the condition in various ways. Vomiting and constipation are such common factors in pregnancy that their full significance is apt to be lost sight of. Again on account of the pregnant condition, operation is generally delayed until the diagnosis can be made beyond a question of a doubt. This frequently means a fatal delay. The pregnancy may complicate the operation. If pregnancy is advanced it may be impossible to find the point of obstruction and mobilize it unless the uterus is emptied of its contents by Cesarean section. If a large incision has been necessary to explore the abdomen, it may be impossible to close the incision over the uterus, for the reason that the abdominal muscles retract and it may be necessary to empty the uterus. Then there is the danger of abortion or premature labor complicating the postoperative period. The disturbances of the abdominal contents by labor may cause leakage at the site of anastomosis and peritonitis result. Again the general condition of the patient may be such that she cannot stand the added strain of labor and death may result.

CASE I.—Mrs. F. T. was seen in consultation on May 31, 1916. She was a primipara seven and one-half months pregnant and gave the following history. Three days previous while out to dinner ate largely of rather undigestible food. On returning home in the evening, she complained of nausea. During the night, she vomited frequently, had loose bowel movements and generalized pain over the abdomen. Her physician who saw her at this time diagnosed the case as one of acute gastrointestinal disturbance due to over-eating. He washed out the stomach, irrigated the colon and introduced  $\frac{1}{2}$  ounce of magnesium sulphate through the stomach tube. In the morning, the patient felt entirely well. During the afternoon, vomiting returned and she had several liquid bowel movements. Temperature and pulse remained normal. She vomited at times the next days, the vomitus being described

as watery with no odor or color. She had no bowel movement on this day. The next morning, the same symptom was present, a high enema was without result. I was asked to see her at noon, her attending physician reporting that she had bowel obstruction. When I saw her, her temperature was 98.2, pulse 80, regular and of good volume. The patient looked remarkably well and stated that she felt well except for a slight pain in the epigastric region and infrequent attacks of vomiting. The vomitus was bright yellow and without odor. On account of the appearance of general well-being of the patient, and the character of the vomitus, I did not feel that it was a case of ileus. Physical examination was negative except for a slight area of tenderness to the right of the epigastrium. On account of the history of the case, however, I advised that she enter the hospital for further study. She was admitted to St. Agnes Hospital early in the afternoon of May 31. Orders were given for pituitrin 1 c.c. every three hours and high rectal enemas containing 20 grains of ox-gall. After the first enema she passed a large mucous cast of the intestine. No bowel movement was obtained. There was no evidence of peristalsis, and vomiting continued at infrequent intervals. At no time was it fecal.

The general condition of the patient remained remarkably good and the pulse and temperature remained normal. On account of the continuation of vomiting, the lack of peristalsis, the failure to obtain a bowel movement and the discharge of a mucous cast, a diagnosis of obstruction was made and operation advised. She was operated on the same afternoon, within six hours after being first seen. An incision was made to the right of the median line above the umbilicus. On opening the abdomen, the fundus of the uterus was found to be near the ensiform, the intestines were crowded above and behind the uterus. A small amount of free fluid was in the abdomen. An area of collapse and distention of the small intestines was noted. The intestines were followed to find the point of obstruction which was found to be a loop of small intestines incarcerated in a small opening in the diaphragm. On freeing the intestines at the point of obstruction, a small area of gangrene of the gut was found. The gangrenous area was resected and the abdomen closed without drainage. Special care was taken to handle the uterus as little as possible during the operation.

After the operation, the vomiting stopped, flatus was passed and a satisfactory bowel movement resulted from an enema. Morphine was given to guard against uterine contraction. In spite of this treatment, she went into labor forty-eight hours after operation and was delivered of a baby which lived for two weeks.

After labor vomiting returned, with distention of the abdomen. Both temperature and pulse rose and there developed every evidence of general peritonitis. The condition of the patient rapidly grew worse and she died four days after operation.

■ **CASE II.**—Mrs. L. N., white, nullipara, aged twenty-six, admitted to the medical ward of St. Agnes Hospital February 29, 1908. She gave the following history. Two weeks ago she developed a tonsil-

litis and was compelled to go to bed. She then complained of pain in the frontal region, back and abdomen. Pain radiates from the epigastric region to the back particularly between the shoulders. She has been constipated for the past ten days and vomits every time she eats. At no time has the vomit been fecal in character. For two months previous to her present illness she had a cough but this has entirely disappeared.

She has had typhoid fever, rheumatism and the usual infectious diseases of childhood. Five years ago she broke her leg. This is the only surgical condition she ever had.

She was married five months ago. Since marriage she has not menstruated. Before marriage menstruation was always regular.

*Physical Examination.*—Lungs negative. Heart negative except for a slight thrill over the precordial region. Abdomen is greatly distended and tympanitic. She complains of pain and tenderness over the entire abdomen. The pain and tenderness is most marked in the epigastric region. The spleen cannot be palpated on account of the distention of the abdomen. The lower border of the liver is not palpable. Temperature on admission, 101° F., pulse 100, respirations 24.

Examination March 5 (five days after admission). Patient complains of very little pain. Tongue coated dark brown. Abdomen tympanitic except in right lower quadrant where there is dullness. On palpation a doughy mass seems to be present in this region.

From date of admission to March 6, bowels have been constipated.

After the use of high enemas small amounts of fecal-stained mucus have been discharged. She does not pass flatus. She has been placed on eserine salicylate without results. Purgatives by the mouth have caused vomiting and no movement of the bowels has resulted.

An examination of the matter discharged after the enemas showed the following: Feces dark brown in color about the consistency of cream. Alkaline in reaction. Many bacteria. Triple phosphates in large amounts. Calcium phosphates present. Few vegetable cells present. Muscle fibers and fat cells not present.

Widal reaction not present.

*Blood Examination.*—March 6, 1908. Leukocytes, 7800; polymorphonuclear, 64 per cent.; small lymphocytes, 26 per cent.; large lymphocytes, 6 per cent.; eosinophiles, 1 per cent.; myelocytes, 3 per cent.

The case was referred to me on March 6, 1908. An examination was made and the following points noted. No subjective signs of pregnancy except the absence of menses. No breast or abdominal signs of pregnancy found. Vulva slightly discolored and bathed in a discharge. Pulsation of the vaginal arteries present. Cervix enlarged and softened. Uterus could not be outlined on account of the abdominal distention and rigidity of the abdominal muscles. No mass could be palpated to the sides of the cervix. Free fluid could

not be demonstrated in the abdominal cavity. No mass found in the abdominal cavity. The patient was etherized and examined but no additional information could be gained. The temperature at this time was 99.4°F., pulse 118, respirations 26, general condition poor. A diagnosis of intestinal obstruction probably in the colon was made and abdominal section advised.

*Operation.*—March 7, 1908. Median abdominal incision. Ascending and transverse colon tremendously distended. Small intestines also distended. Gravid uterus reaching midway between the umbilicus and ensiform. No signs of inflammation anywhere in the lower abdomen. Appendix normal was not removed. At the splenic flexure of the colon a band of adhesions were found constricting the bowel. These were cut and the colon milked from the cecum past the point of obstruction. Abdomen closed in layers.

No difficulty was experienced in this case in bringing together the edges of the abdominal incision. Temperature dropped to normal the second day after operation and remained so until her discharge from the hospital. Bowels moved on the second day after the administration of calomel. No further difficulty in obtaining bowel evacuation. She was discharged from the hospital April 2, 1908.

Patient went to term and was delivered of a dead baby after a difficult labor. Uterus contracted normally and no complications arose during the puerperium.

CASE III.—Sara McG., white, multipara, aged forty-three. Admitted to St. Agnes Hospital December 28, 1908. She was sent in with a diagnosis of pregnancy at six and a half months, complicated by fecal impaction.

The following history was obtained. Patient comes to the hospital complaining of inability to have a bowel movement, persistent vomiting and severe pain over the sigmoid flexure. Father died of asthma, mother of tuberculosis. No history of malignant disease obtainable.

She had chicken-pox and measles in early childhood. Is subject to colds and has a cough most of the time. Otherwise she enjoyed good health.

Born in the United States. Puberty at thirteen years. Menstrual history without interest. Married when twenty-two years old. She has had one child and one miscarriage. Labor was normal and the miscarriages without complication. Present illness began in October, 1908. It started with difficulty in having a stool. She would have frequent desire to defecate but would be unable to empty her bowels. This effort was always associated with severe pain in the left inguinal region. She soon developed constant pain in this locality. She does not remember if this was associated with any symptoms of inflammation. Vomiting was persistent. At first the vomitus was dark green eventually becoming fecal in character. The abdomen became greatly distended and there was marked rigidity especially over the left side low down.



*Physical Examination.*—Patient appears debilitated and weak. Heart, apex beat barely visible, palpable in fifth interspace, one finger's breadth outside the midclavicular line. Heart slightly enlarged on percussion.

Muscle sounds of poor quality. Systolic murmur heard at the apex transmitted to the axilla. No thrill palpable. Lungs, expansion poor but equal over both sides. Tactile fremitus slightly increased on right side over apex. Slightly diminished over the left lower lobe posteriorly. Resonance impaired over the right apex posteriorly. Scattered râles heard all over right lung. Abdomen, greatly distended; tender all over and rigidity is marked. There is apparently a small mass in the left inguinal region. Temperature on admission 98°, pulse 100, respirations 24. Urine negative for casts, albumin, sugar and indican. A leukocyte count made two days after admission showed 16,000 white cells. A differential count was not made. The pulse and temperature remained normal and the patient's general condition improved. There was no vomiting while she was in the hospital and all her pain disappeared. On account of the improvement in the condition of the patient we felt that we might be dealing with a fecal impaction and every effort was made to obtain a bowel movement. In this we were unsuccessful and an operation was decided upon.

*Operation.*—Under ether anesthesia a median abdominal incision was made and a growth the size of an orange involving the sigmoid was found. The colon above the point of obstruction was greatly distended and filled with liquid feces. The colon was opened and drained. The mass was excised and an end-to-end anastomosis was made. The walls of the gut both above and below the growth were very friable, so that we had difficulty in preventing the sutures from tearing through. Fearing for the integrity of the anastomosis a small gauze drain was carried down to the site of operation and brought out of the lower angle of the wound. The incision was closed in layers and great difficulty was experienced in bringing the edges of the incision together though the uterus was not taken out of the abdominal cavity. I regretted at the time that I did not do a Cesarean section as I felt sure that the incision would break down and that the patient would abort.†

The bowels moved the day following operation without recourse to any measures to provoke the same. The temperature remained normal though the pulse rate was slightly increased. The drain was removed on the third day and was followed by a serous discharge.

Several days later this discharge had a slight fecal odor. This ceased in two days and the sinus entirely closed about the eighth day after operation. The sutures in the middle part of the wound cut through and the incision separated without infection. The patient's postoperative history was without further complication for some days. The temperature and pulse remaining normal. On the sixteenth day after operation the temperature was normal and pulse 90. Blood examination showed hemoglobin 65 per cent., red cells 3,110,500, leukocytes 9500. Polymorphonuclear 80 per

cent., small lymphocytes 10 per cent., large lymphocytes 6 per cent., transitional 3 per cent., eosinophiles 1 per cent.

On the morning of the seventeenth day she was seized with excruciating pain over the appendix. At first we thought that this might be due to oncoming labor but an examination failed to confirm this opinion. At no time during the day did she have any signs of labor. The temperature rose to  $100\frac{2}{5}$  and pulse to 134, and respirations to 34. A blood examination showed the following: leukocytes 24,000; polymorphonuclear 90 per cent., small lymphocytes 7 per cent., large lymphocytes 1 per cent., transitional 1 per cent., eosinophiles 1 per cent.

A diagnosis of acute appendicitis was made but the husband of the patient could not be located to obtain consent to reopen the abdomen. The patient refused operation herself. Early in the evening of the same day labor began and was terminated in two hours. A seven months' fetus was delivered which lived four hours. The uterus failed to contract and the patient had a severe post-partum hemorrhage which was controlled by packing with gauze. After the labor the patient's condition was extremely bad and we did not feel justified in attempting any further surgical interference though by this time we had obtained full consent to do whatever was thought best for the patient. The following day the patient was still desperately ill and we decided again not to interfere. On the third there was a localized mass in the appendiceal region apparent in close relationship with the uterus. The patient's condition was better and the pulse and temperature showed a tendency to fall. As the process was apparently localizing itself, it was decided to wait until the patient's condition would justify an abdominal section.

On this day the hemoglobin was 60 per cent.; red cells 3,200,000; leukocytes 20,000; polymorphonuclears 89 per cent.; small lymphocytes 6 per cent.; large lymphocytes 2 per cent.; transitional 1.5 per cent.; eosinophiles 1.5 per cent. Five days later the mass seemed more superficial and closely attached to the uterus. The incision as has been noted had separated and a grooved director was run underneath the fascia until it reached the outer margin of the mass when it was plunged into the abscess cavity and a large quantity of pus escaped. With the escape of pus the temperature and pulse fell to normal and the patient has made a good recovery. Of course, we are not prepared to say in the light of previous drainage that this was an attack of appendicitis but the location of the lesion and the history of acute onset after sixteen days of afebrile convalescence leads us to strongly suspect the correctness of the inference. Pathologic report of mass showed it to be inflammatory in character.

The after history of this case is most interesting. She was lost sight of after her discharge from the hospital. One year later, she entered another hospital with general carcinomatosis of the peritoneal cavity. The mass removed at operation was evidently malignant and not inflammatory as reported by the pathologist.

## DISCUSSION.

DR. COLLIN FOULKROD.—It was a surprise to me to know that because of pregnancy intestinal obstruction could occur. I recall a case reported some years ago to the Society brought into the Presbyterian Maternity with symptoms of intestinal obstruction but pregnant seven months. The patient had been seen by two general surgeons who refused to operate. The obstruction was not acute at the time of examination but became so at the end of the week. At operation it was found that the fundus of the uterus had become incarcerated in the pelvis and the child had developed to one side of the body of the uterus until the pressure had stopped the bowel movement. Cesarean section was done and the patient made a good recovery. It seemed impossible to lift this fundus out without emptying the uterus. In a second case there was a pregnancy of five months. A fibroid of the uterus so obstructed the bowel that operation was done immediately. The fibroid was lifted out at the first operation and the woman allowed to go to term when the uterus was amputated, the child taken out and the woman made a good recovery. The first case was very unusual; the uterus had grown into the pelvis in such a way that there was complete obstruction at the time of operation and it was impossible to dislodge it from below.

Concerning the first case which Dr. McGlinn describes I hesitate to say anything because Dr. Fisher has been so vehement about cureting after an incomplete abortion. I am sorry that Jefferson is not teaching the exploration of the uterus in cases of incomplete abortion. I think the men are in danger of going out and doing just what Dr. McGlinn has described. It would be well to note that I had the pleasure this week of teaching those same men in the Obstetric department the proper method of caring for an incomplete abortion. The teaching of students and residents that the finger can tell what is inside the uterus and that exploration can be made without instrumentation is an important measure. There is no incomplete abortion that cannot be explored and the uterus cleaned out without instrumentation.

DR. GEORGE M. BOYD.—I agree with Dr. Foulkrod fully in the statement that the finger only can locate and intelligently separate the mass that is within the cavity of the uterus. There is a difference of opinion in the profession as to whether or not we should resort to radical methods in incomplete abortion. In 1913 I heard Polak's paper in London at the International Medical Congress. If I remember rightly opinion was about evenly divided regarding the slow, and the rapid and radical method of treating abortion cases. The second case brings to my mind an interesting case of obstruction of the bowel caused by pregnancy due to the attachment of the small intestine to the fundus of the uterus. Two years previously I had operated upon this patient by Cesarean section following obstructed labor due to ventral fixation of the uterus. I liberated the uterus and as I thought, closed the peritoneum over the stump

and left a clean uterus. The woman again became pregnant and advanced smoothly in her pregnancy until there developed a tension at the point of attachment of the small intestine to the fundus. Where I first saw her the uterus was fixed, and grew at the expense of the posterior wall and the labor was obstructed. I freed the uterus, following the Cesarean section but the small intestine became attached to the fundus when the woman reached the eighth month of pregnancy she developed serious symptoms of obstruction. I performed a second Cesarean section, liberated the bowel and the woman made a good recovery.

DR. JOHN M. FISHER.—The man referred to who perforated the uterus evidently was a man who had done a large number of abortions. I have come in contact with three cases of perforation of the uterus in cases of this character. One was done with the curet, another by the use of placental forceps and a third in the use of an instrument for dilating the uterus, all by men who had been in practice for a number of years and had had experience in this line of work. In one case a man of large experience, an ex-resident of one of our large hospitals, perforated the uterus and dragged down a knuckle of intestine. In this particular case the exposed intestine was washed off and returned to the peritoneal cavity and the uterus packed with gauze. The cervix was raised with a tenaculum forceps, an incision made in the Douglas' pouch followed by gauze drainage and the woman made an uninterrupted recovery.

With reference to the treatment of incomplete abortion I did not say that at the Jefferson Hospital examinations were not made. Whatever retained material is present is removed but with as little traumatism as possible. In many cases the uterus can be dilated with the fingers, then by grasping the fundus with the other hand, in a large proportion of cases, the retained material can be squeezed out, while in others it is spontaneously discharged. On introducing the finger it may be necessary to pass it around and detach whatever may be present in the cavity of the uterus. Exceptionally I have used placental forceps. In Jefferson Hospital we have many cases of incomplete abortion and I am confident that there has not been a curetment done for the condition in the last two years. I am sure that the man in general practice treating incomplete abortions will have the largest number of cures in the cases in which he does not use the curet.

In view of this report, in all cases of fibroid tumors would it not be appropriate to do a complete hysterectomy instead of partial?

DR. J. O. ARNOLD.—Dr. McGlinn's report of cases of intestinal obstructions complicating pregnancy, recalls a case that came under my care at the Samaritan Hospital some time ago, in which obstruction of the bowel was the result of another complication of pregnancy, namely, eclampsia. The patient was brought to the hospital after having had a number of convulsions. When I saw her she was in the act of expelling a six months' fetus. She had no more convulsions after the uterus was emptied, and appeared for a time

to be in good general condition. Some hours later, however, it was noted that her abdomen was becoming greatly distended and tympanitic. Attempts to relieve this by purgatives and other means were without results, and the condition grew gradually worse. I believed it to be a case of intestinal obstruction, but a surgeon who saw her did not confirm the diagnosis, and advised continued treatment for the toxemia and other measures for securing bowel action. All our efforts failed, and the case went on to autopsy, where we found an ileocecal intussusception completely obstructing the bowel. Such a complication, I think, must be unusually rare. It was produced, no doubt, by the convulsions, and should have been relieved by early operation.

DR. GEORGE W. OUTERBRIDGE.—As Dr. Fisher has said, these cases do well without opening the abdomen if the intestine is not seriously injured. They should all be watched and examined with the greatest care, however. A year ago I saw a case which emphasized the possible seriousness of uterine perforation, even in the absence of threatening symptoms. I was called one evening to the Methodist Hospital to see a patient in whom the physician had attempted that afternoon to empty the uterus, and thought he had punctured it. I found the woman lying in bed absolutely comfortable. Temperature was normal, pulse 82, and the only symptom was a slight bloody discharge from the vagina. By abdominal palpation there was very slight resistance on the right side, so slight that we were not positive it was present. Nothing was discovered by vaginal examination. There was a history of spontaneous abortion three weeks before, but the patient had continued to have a discharge. The doctor said that in attempting to empty the uterus he knew he had brought down a loop of intestine. Fortunately, we did an immediate operation, and found a good-sized, rugged perforation in the fundus of the uterus, from which there was rather free bleeding, and a loop of small intestine, about 18 inches long, which had been torn completely loose from the mesentery. Fortunately, the lumen of the bowel had not been opened. The woman had three or four children, and in view of the danger of infection hysterectomy was done, leaving both ovaries, and the intestine was resected. She made a perfect recovery. In this case there had been no shock, no evidence of hemorrhage, nothing to indicate the gravity of the condition except the statement of the family physician that he had seen the loop of intestine come down.

DR. FRANK C. HAMMOND.—If the chair may be permitted, I should like to cite two interesting cases. The first patient was seen in consultation by one of the members of this Society. The woman was two months pregnant and the attending physician was called in to see her shortly after what was described to him as a convulsive seizure. Although the woman was markedly neurotic, the attending physician considered the seizure as an eclamptic convulsion and asked for consultation. The consultant explained that a woman only two months pregnant would not show the symptoms of toxemia of pregnancy sufficiently to produce convulsive

seizures and discouraged the idea of the attending physician of emptying the uterus. The patient had another seizure a couple of hours subsequent to the consultation and the attending physician called in a friend to administer ether and emptied the uterus. Although this woman was only two months pregnant, there was removed per vaginam material which filled a dishpan which was being used in lieu of a bucket. The attending physician realized that some serious mistake had been made and again sent for the consultant who upon his arrival estimated that at least the entire length of the small intestine had been removed. In the efforts attempted in emptying the uterus, the uterus was perforated, a part of the intestine was brought down in the vagina, not recognized, and the attending physician continued pulling on it until the entire small intestine had been stripped from its mesentery, torn loose from its proximal and distal attachments and was thus removed. The consultant considered no abdominal operation was indicated and so advised the attending physician. About six hours subsequently, as the woman was still living, the consultant was again called, very much surprised that the patient had lived that length of time. Death occurred very shortly after this visit. It seems incredible that a man emptying a uterus only two months pregnant would not realize that the contents of the uterine cavity at this stage of pregnancy would be entirely out of proportion to the quantity of "material" which was being removed and further having had hospital experience, he certainly should have recognized bowel when he had a sufficient quantity of it out to extend beyond the vulva opening.

The second case was one of incomplete abortion curetted by the attending physician. Subsequent to the curettage, the patient showed evidence of shock and was removed to a hospital. The surgeon on duty diagnosed the case as one of internal hemorrhage, opened the abdomen and found the transverse colon in the pelvis at the level of the brim. The transverse colon had been completely torn through transversely. In other words, at the time of the curettage, the uterus had been perforated, the ptoed colon was evidently caught between the curet and the fundus of the uterus and thus torn through. An end-to-end anastomosis was done but the patient died very shortly afterward.

The first case cited appealed to me very strongly when Dr. Fisher in the discussion of his paper stated what should be taught the interne, as this is an evidence of the need of diagnosis.

DR. GEORGE ERETY SHOEMAKER reported three cases.

#### I. FIBROMA OF UTERUS ASSOCIATED WITH MALIGNANCY.

Aside from any inherent interest, especially in the first case because of its complications, the importance of the association of fibroma and malignancy makes the report of every case important.

1. Fibroma of uterus. Probable sarcomatous degeneration complicated by ascites and hydrothorax.

M. L., aged thirty-three; white; Italian. Married at twenty-eight in 1909.

Births, none. Miscarriages, one a year ago. Applied at the Presbyterian Hospital September 12, 1916 complaining of pain and enlargement of abdomen.

*Menses*.—Regular except that in the last six weeks there had been repeated bleeding.

*Clinical History*.—(Obtained through an interpreter.)

Well until June, 1916, when sudden and general abdominal pain began together with swelling of abdomen. Pain stopped after two months and did not return. Within one month the abdomen was fully distended and has not changed since. No swelling in legs; no headaches; very slight cough; was short of breath before present illness.

*Examination* shows a small Italian woman, well developed, rather thin, pupils react to light and accommodation; no jaundice; tongue clean. Visible retraction of the intercostal spaces in respiration. The right chest completely filled with fluid up to a small area below the clavicle in front which is hyperresonant; no râles or friction sounds.

*Abdomen* distended by fluid from the symphysis to the xiphoid, spreading the ribs; the girth is 37 inches; skin tense; a few enlarged superficial veins in the epigastrium. Extremities thin and swollen; no definite cachexia.

A movable tumor irregular in outline with firm rounded projections; hard, moves with the uterus, larger to the right of the median line; different parts of the tumor vary from firm to softer. A large amount of peritoneal fluid.

Aspiration of the right pleura in the sixth interspace, 2070 c.c. clear, straw-colored fluid obtained.

*Laboratory Report*.—Negative for organisms; no acid-fast bacilli. Dr. Talley in consultation reports the cardiac condition good and the pleura thickened. Advice that the tapping of the chest be repeated.

Eleven days after the first tapping, aspiration of right chest yielded 2250 c.c., 600 cells per cubic centimeter, 95 per cent. lymphocytes. Smears negative for organisms. Culture negative. No acid-fast bacilli.

Dr. Talley reports hyperresonance posterior from the apex to two fingers breadth below the spine of the scapula; flat for three fingers below this, then resonance down to liver dullness. Tactile fremitus good from apex to inferior angle of scapula and lessened below that. Right chest resonant in front; the heart sounds regular.

*Diagnosis*.—Chronic pleurisy posteriorly.

Three weeks later, the chest having rapidly refilled, 2800 c.c. of straw-colored fluid aspirated. Three days later the right chest was again full; the ascites which was somewhat diminished after the first aspiration of the chest has again become extreme.

Oct. 24, 1916. Aspiration of pleural cavity repeated for the fourth time, four days after last tapping. 2400 c.c. obtained, a total of 9520 c.c. or 20 pints in five weeks.

*Urine quantity* cannot be reliably obtained because of the absence of coöperation of patient. The p.s.p. estimation is 400 c.c. in the first hour, 20 per cent.; 250 c.c. in the second hour, 30 per cent. = 50

per cent. in two hours. There is no nephritis. The urine is acid; shows no casts; very faint trace of albumin and no sugar. The specific gravity is above the normal.

*Blood*.—Hemoglobin 48 per cent., red cells 4,400,000, w.b.c. 7400 on admission, 15,100 five weeks later.

*Wassermann*, negative.

*Von Pirquet* skin test for tuberculosis, negative.

*Blood pressure* 118-85-33.

Oct. 25, 1916. Operation before the Clinical Congress of Surgeons, gas-ether, tapping of hydrothorax having been performed the day previous. On median abdominal incision several pints of ascitic fluid escaped. The tumor irregularly shaped, free from adhesions, extending above the umbilicus, involved the body of the uterus. Hysterectomy was performed. There were no evidences of miliary or cheesy deposits suggesting tuberculosis in any portion of the abdomen and no gland enlargements were discovered. The liver was softer than normal, appeared congested and slightly enlarged. Both tubes, ovaries and uterus out. Closure without drainage.

*Laboratory Report*.—Fibroma of uterus, marked cellular proliferation in deeper portions suggestive of sarcoma.

The patient made an excellent clinical recovery and somewhat to our surprise the fluid did not reaccumulate in the pleural cavity or abdomen while she remained in the hospital nor for a period of several weeks afterward during which her condition was followed. X-ray treatment by the Coolidge tube was advised.

## 2. MALIGNANT CYST ADENOMA OF THE OVARY ASSOCIATED WITH FIBROMA OF THE UTERUS.

Mrs F., forty-three years. Never pregnant. The normal type of menstruation showed its first change four months before coming under observation; the interval was now but two weeks, the duration, ten to fourteen days. There was no odor and no discharge between though the odor of the flow when present was markedly disagreeable. Very little loss of weight; some cachexia. Distress was through and through the pelvis to the back. Blood pressure 135-70. A hard, round, smooth uterine tumor extended from the lower pelvis to a point above the navel, firmly impacted and tightly fitting, irregular in contour.

*Operation*.—Dec. 19, 1916. Between 1 and 2 pints of mucilaginous fluid free in the peritoneal cavity. Tumor firmly imbedded in the pelvis; many large venous sinuses especially behind and near the left ovary, which bled freely when overlying adhesions were separated. Left ovary firmly adherent to the sigmoid and left broad ligament. The ovary was the size of an orange and contained three main cysts, one of which had ruptured and its walls were shrunk and thickened. Possibly this accounted for the gelatinous fluid in the peritoneal cavity. The uterus, both ovaries and tubes were removed, including the cervix because of the suspicion of malignancy in the ovary. The vagina was sutured tightly with catgut, the peritoneum closed



over. There was no evident infiltration of other structures and no papillary implantation appeared elsewhere.

The patient made a normal recovery from the operation and was discharged from the hospital well, having received five postoperative  $x$ -ray treatments with the object of preventing recurrence of malignancy. She was discharged to the care of her physician with instructions to continue this treatment according to the advice of the Röntgenologist.

*Report of the Pathological Laboratory.*—Dr. Pfeiffer. Fibroma of uterus. Chronic cervicitis and fibrosis. Cyst adenoma, carcinoma of ovary infiltrating round ligament and adjacent portion of uterus. Extension into fibroma not demonstrated. Chronic metritis and endometritis. Chronic interstitial salpingitis. Other ovary fibrocystic.

### 3. SARCOMA IN THE CENTRAL PORTION OF A UTERINE FIBROMA: SYPHILIS.

Mrs. R., aged thirty; births, none; miscarriages, four, one of them six years ago followed by peritonitis and several weeks later by a right-sided inflammation and laparotomy. Menses never regular, four and one-half to five weeks, three days' duration, one napkin a day. No pain at all until about one year ago when the interval was shortened and the quantity increased. For the past six months, interval was eight to ten days, duration eleven to fifteen days; the quantity varying from eight to nine napkins a day down to three or four. Odor ammoniacal; in the morning like stale meat. No pain.

Hard and ringing cough with gray expectoration. Has lost 20 pounds. Abdomen increased in size for one year. The feet have swollen occasionally. The heart and lungs are negative except for slight bronchitis. Blood pressure 130-70. The urine is negative. The Wassermann test is 4 plus but there are no other signs of syphilis.

*Examination* shows the uterus enlarged and irregular reaching above the navel, nodular, hard, of the consistency of fibroma.

*Operation.*—Median incision, omentum adherent to the anterior pelvic brim, clear jelly-like masses in the peritoneal cavity; tubes and ovaries strongly adherent behind the tumor. Both tubes contained clear fluid. Both ovaries contained cysts up to the size of a walnut; firmly adherent. Both tubes and ovaries removed except a small portion of the left ovary. The uterus which was round and smooth was removed. A small nodule in the left broad ligament was also removed which was afterward reported microscopically to be a fibroma.

It may be noted that in another operation for sarcoma and fibroma some three years ago, a similar separated smooth nodule in the broad ligament was declared to be fibroma.

Owing to difficulties in details there was some bleeding and considerable shock. The patient made a perfectly satisfactory recovery; was afterward subjected to application of  $x$ -ray from Coolidge tube.

Mercury salicylate was administered hypodermically, followed by great general improvement. The patient was discharged from the hospital well. Wound aseptically healed.

Report of the Pathological Laboratory. Dr. Pfeiffer. Sarcomatous degeneration of interior portion of myoma of uterus. Cervix not involved. Fibrocystic ovary. Chronic salpingitis.

In two of these patients there was very little to show that they were not ordinary fibromas which in some hands would be treated by x-ray.

They all serve to confirm the view that a fibroma, if it is not very small and very quiet, is better treated by surgery than by any other method. Few of them are without some complications sooner or later, either from pressure, tubal or ovarian disease, partial or complete obstruction of intestine; from 5 to 7 per cent. have malignant degeneration somewhere in the field. Many undergo necrosis or cause serious trouble if pregnancy occurs.

#### DISCUSSION.

DR. STEPHEN E. TRACY.—Dr. Shoemaker's paper emphasizes the frequency with which fibroids of the uterus are associated with malignancy of the pelvic organs. I agree with him that fibroids which produce symptoms should be treated by surgery. According to statistics, malignancy degeneration in the cervical stump after supravaginal hysterectomy for fibroids occurs in only 1 per cent. of the cases. In cases in which there is a suspicion of malignancy a complete hysterectomy should be done, but not otherwise, as the mortality after complete hysterectomy is more than double that of the supravaginal operation, and the morbidity is much greater after the complete operation.

DR. SHOEMAKER, closing.—My own practice would be to do complete hysterectomy if I had any reason to believe there was malignant degeneration. In ordinary benign fibroid cases, however, it is safer to leave the cervix. In this case, according to the examination, there was no sarcoma in the cervix and I believe recurrence is quite as apt to occur at some distant point as nearby.

## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON OBSTETRICS AND GYNECOLOGY.

*Stated Meeting, Held January 23, 1917.*

DR. GEORGE W. KOSMAK *in the Chair.*

DR. WILLIAM H. CARY reported a case of

#### OCCIPITOPOSTERIOR POSITION IN THE PRIMIPARA; INFLUENCE OF SCOPOLAMINE ON DILATATION, FOLLOWED BY MANUAL ROTATION.

The assertion made by many men that they view the complication of occipitoposterior position without apprehension may be chiefly due to their experience. The fact remains, however, that the usual method of terminating labor in the primipara, when its progress has been hopelessly arrested with membranes ruptured, and occiput presentation remaining posterior, results in the percentage of infant mortality and degree of maternal morbidity that is far from satisfactory. While the type of case that I have chosen to report may seem commonplace, its frequency adds an argument for its consideration, if by the discussion we may be enabled to manage more successfully this form of dystocia.

The patient was twenty years of age and pregnant for the first time. Labor was due October 22, 1916. She had lived out-of-doors all summer and was well throughout her pregnancy. The fetal head engaged early, October 15, at 1.30 P. M., one week before the estimated time. The membranes had ruptured without previous pains. That afternoon the nurse reported a few painful contractions accompanied by loss of water. Opiates and bromides were ordered to insure rest that night. The patient slept four hours. The following morning examination showed the usual findings of left occipitoposterior position. The cervix was not dilated, the fetal head being 1 inch from the pelvic floor; the anterior fontanelle was easily felt to the patient's right. There were irregular pains at frequent intervals all day, developing at 8.30 P. M. into severe first-stage type. The cervix was now thin and dilated to the size of a half dollar. The patient complained of fatigue but was in good morale. The pains increased in severity, occurring every four minutes. At midnight, in spite of one hypodermic of morphine and scopolamine, she became hysterical, exhibited unmistakable signs of tire, and examination showed no

progress in the labor. The membranes had now been ruptured thirty-six hours; first-stage pains had been in progress eighteen hours; labor was arrested, and the patient hysterical and in bad morale. The fetal heart was normal. I felt that proper management called for the patient's removal to the hospital and this was accordingly carried out. The temptation to deliver the patient at this time was considerable and would have been possible by manual dilatation of the cervix and rather difficult Scanzoni delivery. Such a delivery, however, would have been attended with risk to the infant and injury to the mother far greater than the method pursued.

Being exhausted to an extent that caused me to question my own judgment, I asked my colleague, Dr. Sidney Smith, to relieve me while I secured rest. By the administration of scopolamine (Roche), which Dr. Smith was especially qualified to supervise, we planned to preserve the patient's strength, while hoping for further dilatation of the cervix.

At 7 A. M. Dr. Smith reported that the patient's pulse had lowered and that he had secured frequent intervals of sleep. He suggested another interview.

Examination now revealed the cervix eliminated except a small anterior segment and the mother and baby in good condition. The patient was now completely anesthetized and the left occipitoposterior position was changed to the right occipitoposition by the rotary version of Pomeroy.

At 10 A. M., three hours later, the patient had lowered the head to the pelvic floor and a simple forceps delivery was possible. This was preceded by a median perineotomy which was immediately repaired. The baby cried at once upon delivery and both mother and baby made a normal convalescence.

Special Features.—First, I have long felt that the value of inserting a bag to induce labor, preserve water, and dilate the cervix was sufficiently doubtful not to justify the risk of infection which its use involves. Second, preserving the patient's strength and nerve force with the judicious use of narcotics throughout the long first stage, which is inevitable, contributes much to the management of these cases. Third, I am convinced that the obstetrical attendant may reach a state of tire which affects his judgment to such an extent as to make the help of a fresh assistant imperative. Fourth, the management of certain selected cases of posterior position of the occiput, cases in which the inability of the patient to deliver herself has been fairly demonstrated, is best carried out as outlined in this case report. Finally, delivery of all primiparæ should be conducted in a well-regulated hospital, with full surgical technic.

#### DISCUSSION.

DR. FREDERICK C. HOLDEN.—I consider the management of cases such as Dr. Cary has described as one of the great problems of obstetrics. Many of the cases which commence as occipitoposterior with poor flexion finally end up, if they are not rotated, with a

dystocia due to a Bandl's retraction ring. The more I study Dr. Pomeroy's method the more I am convinced it should be used in correcting the occipitoposterior position. However, it is not the procedure to be undertaken in the tenement and should be used only under conditions of careful aseptic surgical technic.

DR. ELIOT BISHOP reported a case of

#### ACCIDENTAL HEMORRHAGE.

This patient, twenty years of age, had had one previous labor which was spontaneous in October, 1914. There had been laceration and repair. She had had no miscarriages and gave a negative menstrual history. Her last period was April 10, 1916, and was on time. She was admitted to the Greenpoint Hospital on January 10, 1917 five days before the calculated day of labor. The physical examination was negative except for a lumbosacral kyphosis. The blood pressure was 160 systolic and 60 diastolic. The urine showed a trace of albumin and no casts. Her pelvimetry was normal. There was a vertex presentation with a well-engaged head. The fetal heart was 140 to the right and below. On January 15, at 9.45 A. M. while sitting in a chair with no premonitory pain or symptoms she felt herself suddenly become wet and discovered that it was blood. Rectal examination showed the head in the midpelvis. There was two fingers dilatation and the cervix was not completely effaced. The membranes were unruptured, but rupture was done by the resident on vaginal examination. No heart sounds could be heard and the fetal outline could not be determined. No contraction of the uterus was noticed, but instead a board-like rigidity. The patient's pulse was at this time 130; it soon dropped to 90 and then rose to 120. About 10.15 she began to show systemic signs of hemorrhage, restlessness, thirst and blanching. Her pulse became weaker in quality. The uterus increased slightly in size and moderate shock developed. Under anesthesia a vaginal hysterotomy was done in the usual way and also a median perineotomy. Forceps were then applied and a stillborn child with asphyxia pallida was delivered. The placenta was free in the uterine cavity. Hypodermoclysis was employed during the operation and the patient left the table in fair condition. She developed some febrile disturbance on the fourth and fifth day, but her temperature was now normal. The day after operation her blood showed 60 per cent. hemoglobin and 2,000,000 red blood cells. The blood pressure was 90 systolic and 60 diastolic.

#### DISCUSSION.

DR. WILLIAM H. CARY.—I would like to ask if there was any nephritis present in this case.

DR. BISHOP.—The urinary examination showed just a trace of albumin in her uncatheterized admission specimen and the blood pressure was only 116 systolic.

DR. KOSMAK.—Why was the delivery not undertaken at an earlier moment?

DR. HOLDEN.—At what time did the hemorrhage occur?

DR. BISHOP.—We did not undertake to operate earlier because the condition of the patient was bad and as the fetal heart sound was lost immediate operation could not save the child. We considered the advisability of a Cesarean section but thought it better to postpone delivery until the patient had rallied.

DR. KOSMAK.—Why were the membranes ruptured at the time mentioned?

DR. BISHOP.—The Resident feared a placenta previa, but finding none, thought that by rupturing the membranes the intrauterine pressure would be increased and that the pressure might also aid in controlling the bleeding.

DR. KOSMAK.—I know how difficult these cases are but it is my feeling that if we can make the diagnosis early enough Cesarean section offers the best chance for the patient. Even if we do get a stillborn child we have the advantage of getting to the seat of the hemorrhage quickly.

DR. ONSLOW A. GORDON, JR., reported

#### THIRTEEN CASES OF ECTOPIC GESTATION, WITH DEDUCTIONS.

During the year there occurred upon the Gynecological Service of the Greenpoint Hospital thirteen cases of ectopic gestation. While this is by no means a large series, the cases have been carefully studied from a standpoint of both diagnosis and treatment and our conclusions may therefore be of interest.

The diagnosis was apparent in eight cases; difficult in five cases, and in three cases we operated upon a diagnosis of ectopic gestation only to find the pathology greatly at odds with our diagnosis. There were two unruptured tubal pregnancies, eight cases in which tubal abortion had taken place, and three cases of tubal rupture.

The conditions which we confused with ectopic gestation were: 1. Ovarian cystoma. 2. Chronic adnexal disease. 3. Pelvic abscess, postabortal. A diagnosis of ovarian cystoma was made on a case of about ten weeks' duration in which there was a plainly palpable abdominal and pelvic tumor of about 15 cm. diameter which was not tender. The diagnosis of chronic adnexal disease was made in a case with bilateral tender palpable masses. The diagnosis of pelvic abscess was made in a case which had previously been curetted for an incomplete abortion and which had a soft mass filling the culdesac.

The cases operated on which were found not to be ectopic gestation were: 1. A small ovarian cystoma about 8 cm. in diameter, with a twisted pedicle. 2. An early uterine pregnancy with a pyosalpinx. 3. A cholecystitis complicated by an incomplete abortion. This case was of special interest because it was apparently a typical one of ectopic gestation. The patient, a woman thirty-one years of age, was admitted to the hospital complaining of

severe abdominal pain and vaginal bleeding. She was the mother of two children, the youngest four years old, and had had no pregnancies since this time. Menstruation was regular until, one month before her admission when she missed her period. One week before admission she was suddenly taken with excruciating abdominal pain located in the gastric region, and at this time she began to flow. Abdominal examination showed a fat abdominal wall with very little tenderness at any point; it was no more marked over the gall-bladder than in the lower abdomen. The vaginal examination gave the signs of a possible early pregnancy with tenderness in the right fornix. This case was operated and the pelvis was found to be negative. Exploration of the abdomen showed a gall-bladder distended by small calculi. The gall-bladder was removed. That incomplete abortion was the condition most often confused with ectopic gestation by the general practitioner was perhaps shown by the fact that three of the cases had been previously curetted at home.

In reply to the question "What made the diagnosis apparent?" I may say that I can find no one constant factor unless it be a careful study of the history as a whole. It is upon this point of the study of the history as a whole that the diagnosis can best be made. There was no one point in the history constantly present. One case had no period of amenorrhea, another no vaginal bleeding and still another no abdominal pain. If we study the history as a whole we find abdominal pain the most constant factor in the cases diagnosed correctly.

The physical findings varied from a case showing no palpable evidence of pregnancy, no abdominal mass or tenderness to a case with definite physical signs of pregnancy and an abdominal and pelvic tumor 15 cm. in diameter. The physical signs, therefore, show such a wide range of variation, dependent chiefly upon the period of gestation, that they are of little value except to substantiate a diagnosis made possible by the history.

As to the treatment, all of these cases were operated upon and in that way the diagnosis was definitely established. All made excellent recoveries. The point of interest in regard to the treatment of ectopic gestation was found first in the time of operation, and, second, in the type of operation. As to the time of operation, we believe all cases should be operated upon as soon as the diagnosis is definitely made except the "tragic" type. The following case from our series illustrates our method of treating even the so-called "tragic" case.

This patient was admitted from the ambulance to Dr. Holden's service at noon on November 11, 1916. She was plainly a surgical emergency. Her face was blanched, expression apathetic, respiration labored, temperature per rectum 98° F., and pulse imperceptible at the wrist. She was immediately placed in the Trendelenburg position and given morphine  $\frac{1}{4}$  grain hypodermatically. In three hours the morphine was repeated and during the night she received two more doses of  $\frac{1}{6}$  grain each. Her blood pressure at 3 P. M.,

three hours after her admission was 100 systolic and 65 diastolic; at 7.00 P. M. it was 110 systolic and 75 diastolic at 8.00 P. M. it was 115 systolic and 75 diastolic, and at 8.00 A. M., the morning after her admission, it had risen to 125 systolic and 70 diastolic. Thus it may be seen that this patient in a period of twenty-four hours had rallied from a condition in which she was pulseless and with a subnormal temperature to a pulse of 96 and a temperature of 100° F. She was operated on at this time and made an uneventful recovery.

As to the type of operation, we have in no instance resorted to a more radical procedure than a salpingo-oophorectomy. This operation we performed eleven times, twice removing only the tube. We do not believe that the possibility of a subsequent ectopic in the opposite tube is sufficient to warrant sterilization of the patient either by double salpingectomy or hysterectomy. All the cases were operated upon by the abdominal route.

Our conclusions may be summarized as follows:

1. The history considered as a whole is the one factor of greatest importance in arriving at a diagnosis of ectopic gestation.
2. The conditions simulating ectopic gestation most closely are incomplete abortion and ovarian tumors.
3. The treatment is operative and the time of operation is as soon as the diagnosis has been made except in those cases in which the patient is suffering severely from shock when the indication is to treat the shock and operate when the patient recovers therefrom.
4. The type of operation should be conservative removing only the affected tube and the ovary when necessary.

#### DISCUSSION.

DR. HIRAM N. VINEBERG.—I came in late and did not hear all the report, but I gathered from what I did hear that excepting in the tragic cases it is better to operate as soon as the diagnosis is made. I would like to ask Dr. Gordon in the case in which he stated that they waited until the following day to operate how much blood he found in the peritoneal cavity. Sometimes the loss of only a small quantity of blood would produce very severe symptoms, the patient being practically pulseless. In these cases the condition improves with the lapse of time. On the other hand, we may get cases that may be described as catyclasmic in which there is a large amount of blood lost and in these one would not have the courage to wait, as the condition does not improve, as a rule on washing, but would feel that the abdomen should be opened immediately. It is a surgical axiom that one should open the abdomen when there is bleeding and stop it. The operation is simple and there is not much shock. By using saline transfusion the patient will be quickly restored, get a good pulse and a good color. This is the only point upon which I would take issue with the reader of the paper.

DR. MEYER RABINOVITZ.—Dr. Gordon's report while comprising but a small number of cases is yet very instructive, for he has studied



them very carefully, and has made logical and useful observations. The points of interest are: 1. Diagnosis. Not only the general practitioner, but the experienced specialist will at times fail to make a proper diagnosis. The most frequent mistake made by the family doctor, is to consider these cases as incomplete abortions, and resorts to curettage. During the past year I have operated on four cases of tubal pregnancy within a short time, each of which have been curetted. To the conditions which may simulate ectopic gestation, mentioned by Dr. Gordon, I would like to add, ovarian cyst with twisted pedicle, rupture of corpus luteum cyst, and early cornual pregnancy with bleeding. 2. Regarding the question of when to operate, I cannot agree with him. At the Beth Israel Hospital we have a rather extensive experience with ectopic gestation, and our dictum is "operate as soon as the diagnosis is made, regardless of whether the patient is in shock or not." So far we have no reason to change our method of procedure, for our results are almost perfect. I can see no logic in the argument of those who advocate immediate operation in cases which are in extremes or as they term them "tragic cases," and prefer to wait in the more favorable types, until the symptoms of shock have subsided. If the tragic cases can stand the operation, the less tragic surely can, and why wait? The general surgeon seldom procrastinates in stopping severe hemorrhage, and why shall the gynecologist? 3. When to infuse? Never before the bleeding point has been located and is under control. Those who proceed otherwise are without the laws of physiology, and their means defeat their aims. 4. Should the ovary on the affected side be removed? Only if diseased, or if the attempt to leave it behind will necessitate unwarranted delay in the operation. Regarding the other tube. In a paper published by me in 1911 on "Successive Tubal Gestation" I have advocated the removal of the opposite tube. I am more conservative now, and follow this procedure only in cases where the nonpregnant tube shows distinct pathological changes.

DR. JAMES N. WEST.—In cases with very severe symptoms in which we have reason to believe ectopic gestation has ruptured, immediate operation is in order, and I would gather into this group all the very severe cases because they may die if not operated upon. For this reason we have adopted the plan of operating at once. As an illustration, I may cite the case of a woman whom I was called to see in consultation. I found the patient unconscious and made the diagnosis of ruptured ectopic gestation with severe hemorrhage. We had no instruments except a pocket case.

We devised an apparatus for making an infusion by the use of a medicine dropper and a fountain syringe. After giving the infusion the pulse came up, operation was performed and a ruptured horn was found with active arterial bleeding. The abdomen was filled with blood. Though the operation was done quickly and the wound closed quickly and the patient regained consciousness, she died four or five hours afterward. I have seen a number of cases in which the patient came out of shock while preparations were being made for

operation. I have had a number of cases with severe symptoms but this was the only one who died, and she died because she did not have blood enough left to keep up processes of life.

DR. HOLDEN.—With reference to the question as to whether we should wait until after the patient has recovered from shock before operating, I take the ground that in many instances if the patient is put in the Trendelenburg position and given a very small quantity of water by the mouth, thoroughly morphinized so that she is put at rest, the bleeding will stop before she bleeds to death.

DR. HARRY ARANOW.—I was brought up under the teaching that in cases of ectopic gestation in a state of shock we should do nothing but put them up in the Trendelenburg position, morphinize them and then wait and watch them closely. Personally I have known of several cases that died under this treatment and I have had one of two cases die under this treatment. As House Surgeon, I remember one case with a ruptured ectopic who was morphinized, etc., but she became worse and I sent for the visiting surgeon but when he came the patient was dead. After such an experience as this I now operate on every case and with very favorable results. Although my experience has been limited, it has taught me that it is better to operate. One man I know who has followed the waiting policy, reports 100 cases. I know of two or three *preoperative* deaths in this series *accidentally* not included in the report, and this makes his percentage of mortality too high.

DR. EDWARD M. COLIE, JR.—I want to say something in support of the view Dr. Gordon has taken. At one time I made an investigation based on definite statistics. For some months we collected these cases; of which there were some fifty in our hospital service and we noted the length of time elapsing from the time of rupture to that of operation and also the time elapsing from the time of admission to the hospital until the time of operation. Our statistics show that the results were better where the patients were allowed to come out of shock before operation. I think the omentum takes care of the hemorrhage in most of these cases. We found that the time between rupture and operation averaged 4.8 days for a large number of cases.

DR. WEST.—In my cases transfusion has gone hand in hand with the operation. It is said that more extensive bleeding comes from transfusion, but I believe the bleeding caused by transfusion is a negligible quantity and the transfusion brings the pulse up very quickly.

DR. KOSMAK.—I want to call attention to the difficulty of diagnosis in these cases for I believe that this is a point which deserves more attention than operation, since the results in operation are generally satisfactory. It is not always fair to condemn the general practitioner or even the specialist for curetting some of these patients with ectopic gestation who do not present definite symptoms. In many such cases a curettage may seem the only thing to do. When we have a woman who has continued bleeding the only thing to do is to go in and see if there is anything in the uterus. When

we make an examination under ether we may find a mass that is causing the bleeding. With the idea that we have found an ectopic gestation we may open the abdomen and find only an old pus tube or an enlarged ovary. If one does a curettage he should be extremely careful to have the curetings examined and should keep the patient in bed for a week.

The one point I would specially emphasize is that the examination of the patient should be made under anesthesia, because the resistance of the patient may lead to rough manipulation which will result in rupture of the ectopic sac, whereas if the examination is conducted under anesthesia much less force will be used in determining the condition.

DR. GORDON, in closing the discussion, said: "In reply to Dr. Vineberg's question, I would say that this abdomen was filled with blood both clotted and unclotted at the time of operation. From statistics and from our experience it seems to us that these patients do better if they are not operated on until shock is over. In regard to the large number of deaths among those not operated upon it is well to remember that if they had been operated on they might have been classed as operative deaths instead of nonoperative deaths."

DR. JAMES N. WEST presented the following cases:

VERY LARGE TUBERCULAR KIDNEY. OPERATION; RECOVERY.

CASE I.—Mrs. J. A., aged twenty-eight, married. Admitted to Post-Graduate Hospital, April 11, 1915. Family history negative. Has had no serious illness until the present one. Has had no operations. About one year ago noticed a tumor in the right side extending from the umbilicus toward the back. She had no pain or discomfort except frequency of urination. She has lost weight and for the past week has been vomiting. Has had no chills or fever at any time. The tumor has been growing larger. Periods have been regular. No pregnancies.

*Examination.*—Heart and lungs negative. The abdomen shows a tense, rounded mass occupying the right side to the median line, downward to the crest of the ilium and backward to the region of the liver and kidney. The mass feels hard and gives a flat percussion note. The intestines occupy the part of the abdomen to the left of the umbilicus.

*Diagnosis.*—Tumor of the right kidney.

*Examination of the Urine.*—April 19, sp. gr. 1025, yellow, acid, albumin none, sugar none.

*Microscopical.*—A few epithelial cells and leukocytes. Three examinations gave practically the same findings.

*Blood Examination.*—Leukocytes, 29,000; polynuclears, 92 per cent.; lymphocytes, 8 per cent.; neutrophils, 2 large; neutrophils, 6 small.

April 14, 1915. A radiographic examination of the urinary tract shows the right kidney to be enormously enlarged, the lower pole

extending to the crest of the ilium. The left kidney shadow appears to be normal. (See radiograph.) (Plate No. 26454-55).

Cystoscopic examination by Dr. Terry. The bladder was negative. The right ureter could not be catheterized. The left ureter was catheterized and discharged normal urine. After these various examinations were completed, a diagnosis of large pyonephrosis, probably tubercular, was made.

Operation, April 19, 1915. Patient in left lateral position with elevation of center of the trunk. An incision from the lower border of the last right rib to McBurney's point separating the superficial and cutting through the deeper muscular layers. The peritoneum was freed and pushed toward the left and the kidney mass exposed. The ureter was tied off as low as possible and the mass freed of adhesions and lifted upward; the vessels were tied off with a No. 2 chromic catgut and the mass cut away. The wound was closed *en masse* with silkworm gut and a drain of washed iodoform gauze and a medium-sized cigarette drain were inserted.

The wound was closed *en masse* because there was considerable shock.

*Pathological Report.*—March 19, 1915.

Gross: Specimen consists of a very large kidney measuring 16 by 12 by 8 cm. The surface has large lobulated elevations upon it. The color is reddish yellow and consistency is soft. On section the living tissue comprises only a hollow shell varying 0.5 to 1 cm. in thickness, which contains semisolid grayish-yellow caseous material.

*Microscopic.*—No normal kidney tissue remains, but here and there evidence of a hyaline glomerulus may be observed. The living tissue principally consists of old and newly formed fibrous tissue through which inflammatory cells, largely of the mononuclear type are scattered. Along the inner surface are collections of epithelial cells which in some cases present a picture quite characteristic of tuberculosis.

*Diagnosis.*—Tubercular pyelonephritis.

The patient suffered considerably from shock, from which she rapidly recovered. There was considerable drainage. The drains were gradually removed. She was discharged in good condition but with two small sinuses still remaining, on July 3, 1915. The lower one was still discharging slightly three months later, but at last report, I understand that no sinuses remained.

**DEAD KIDNEY, CONTAINING ANGULAR STONE. REMOVAL OF KIDNEY.  
RECOVERY.**

**CASE II.**—Mr. A. S., aged forty, admitted to the Post-Graduate Hospital January 20, 1916.

**STONE IN LEFT KIDNEY. EXTRACTION; RECOVERY.**

**CASE III.**—Miss P. V., aged eighteen. Admitted to Post-Graduate May 14, 1916. Family history negative. Menstrual history

negative. Present illness began ten years ago with pain in upper left quadrant of abdomen, radiating toward back. Pain is intermittent and severe at times. Has no relation to eating. Is sometimes relieved by hot applications. Has had no hematuria. Symptoms have become so continuous and severe that she seeks hospital relief. Heart and lungs negative. Body well nourished, color good.

Röntgen ray examination, May 15, 1916. The left kidney shows an irregular triangular calculus in the pelvis of the left kidney which is moderately enlarged (see Fig. 1). The right kidney is exceedingly small. May 16. Cystoscopy by Dr. Furniss. Urine slightly turbid, bladder and ureters appear normal. Indigo-



FIG. 1.

carmin injected intravenously. Strong illumination, right 7 inches, left  $8\frac{1}{2}$  inches. Examination of urine on admission showed a trace of albumin, acid reaction, small number of epithelial cells and leukocytes, crystals of calcium oxalate.

Operation May 19, 1916. Ether narcosis. Dr. Furniss assisting. Incision on left side from twelfth rib to crest of ilium. Large kidney brought through the wound, fat stripped from posterior surface of kidney and pelvis. Incision in pelvis made posteriorly and stone removed with forceps—a small piece broke away and was left behind. Attempts to remove this with forceps started considerable hemorrhage and were abandoned. The operator removed

his glove and loosened the stone with the little finger of the left hand when it came into sight and it was then removed. The incision in the pelvis was closed with No. 1 plain catgut, kidney returned to its place and a small rubber drain placed through the abdominal wound down to the kidney and the abdominal wound closed in layers with catgut.

The highest temperature was reached at the end of the first day, 101.2° F. The drainage was removed on the third day. Wound healed by first intention and there was no drainage of urine.

The urine was tinged with blood for the first few days, but this had entirely disappeared when the patient was discharged on June 6th.

This patient was seen several months afterward and remained perfectly well.

The writer reports these cases because each is rather typical of a class and each offers some features of especial interest. The case of tubercular kidney was the largest he has ever seen and removal of a fragment of stone with the little finger ungloved was a feature of operative interest in the second. The clinical history in the case where the kidney was destroyed and the presence of the quadrilateral stone also gave particular interest to the third case.

#### DISCUSSION.

DR. HIRAM N. VINEBERG.—I am particularly interested in the case of tubercular kidney owing to the fact that I have had considerable experience with tubercular kidneys, having removed eighteen. In one instance in which we did not suppose there was kidney trouble but thought we were dealing with a large abdominal tumor, upon opening the abdomen we found a large tumor of the kidney. This was removed without rupture or splitting of the peritoneum. It came out easily by this route and I think this route may be given preference over that of going in at the back. As a rule, all tubercular kidneys cause secondary infection of the bladder and that is what sends the patient to the physician. When we get a case of cystitis in which washing out the bladder with nitrate of silver does not effect a cure we are safe in making a diagnosis of tuberculosis of the kidney. Most intractable cases of cystitis are due to tuberculosis invading the bladder secondarily. There are cases in which the sac is closed off from the ureter and there is no discharge from this mass into the bladder, but in these cases the tumor itself gives rise to symptoms. But there are some who take the position that the tuberculosis cures itself. We will sometimes meet a condition like this which requires operation. I recall one patient who came to my office to find out why she was passing blood in the urine. She had consulted her physician and he told her he could not say why. She was a stout woman but I suspected stone and sent her to have her kidneys x-rayed. The x-ray showed an enormous stone in the pelvis of the kidney and the only thing to do was to remove the kidney, which was done.

DR. DAVID W. TOVEY.—I would like to ask Dr. West what he did with the ureter, as this is one of the important points, in removing a kidney. If we ligate it and drop it; it may be all right, but if diseased it is better to make an incision near Poupart's ligament, and cut it off near the bladder. I think, that if we can stop all bleeding, close the incision without putting in drainage, it is preferable to do so, as putting in a drain may lead to the formation of a sinus.

DR. RABINOVITZ.—We may get a sinus if these tumors are approached from behind. I have had experience with two tumors of the kidney, one a large hydronephroma and I think the approach should not be made posteriorly.

DR. WEST, in closing the discussion, said: "The question of how to deal with the ureter presents a problem as some of these ureters are diseased and thickened, sometimes to such an extent that one is unable to catheterize them. In the first case I cut the ureter off low down as the operation necessitated an extensive exposure reaching from the twelfth rib to McBurney's point. In the second case the ureter was tied off and left to take care of itself. With reference to drainage, it may be better not to drain in some cases but in the first case reported here there was too much pus. I believe there was about a gallon. We did not know we had a tuberculous kidney; we thought there might be other microorganisms. The woman did have a sinus lasting about three months, but it has now been closed up for a long time."

DR. HIRAM N. VINEBERG made a preliminary report on a case of

#### COMPLETE PROCIDENTIA IN A NULLIPARA.

Prolapse of the uterus as we know it is one of the most common affections of women who have borne children and as is to be expected is very rare in nulliparæ. In my entire experience I can recall having seen only four or five genuine cases. It is surprising therefore to note that Weinberg asserts that prolapse of the uterus in the new-born and in nulliparæ constitutes 3.45 per cent. of all cases of prolapse. Nebesky in a series of 223 cases of prolapse reports sixteen cases in nulliparous women. They comprise cases caused by pressure of large abdominal tumors and cases of slight prolapse associated with retroversion of the uterus and also cases of senile atrophy, and one case caused by trauma. When it occurs in the new-born it is usually associated with congenital defects, the most common of which is spina bifida, the percentage being placed as high as 86.

In the adult nullipara it is not infrequently attended with spina bifida occulta, a fact which is not generally known. This and many other interesting features of the subject cannot be entered into at present but will be treated at full length in a future communication.

The patient whose case I wish to report was twenty-nine years of age, single, and was admitted to my service at Mount Sinai Hospital, January 6, 1917. Her father died at the age of forty of cancer of the throat. Her menstruation began at the age of twelve years and was regular of the four-weekly type, of three days duration and was

attended with considerable abdominal and pelvic pain. She does not remember having had any acute illness.

From her twelfth year she noticed something protruded from her vagina when she was in the erect position. The condition had been steadily progressing, so that latterly the mass was constantly outside of the vulva. For the same period she has had dragging pains in the vagina, especially marked on defecation, urination and on walking. She has suffered from general abdominal cramps, which are worse during menstruation. She has for years vomited immediately after meals, once or twice a day, the vomitus consisting of food and mucus but never blood. Other associated symptoms were acid taste, some eructations and constipation. For the past four years she has had painful defecation attended with considerable protrusion of the rectum, but has never passed blood with her stools.

Physical examination at the time she presented herself showed the patient anemic, haggard looking, poorly nourished, and mentality below par; she answered questions slowly. Her abdominal walls were thin and flabby. In the supine position, on bearing down, the lower half of the uterus projected beyond the introitus and about two inches of the rectum protrudes outside the anal sphincter. The cervical os was that of the virgin uterus. The adnexa were prolapsed, but not thickened.

An x-ray of the spine showed no abnormality of the vertebra, in other words, there was no evidence of a spina bifida occulta.

On January 9, I did a laparotomy and obliterated Douglas culdesac by several tiers of Pagenstecher sutures passed in a circular direction. The Douglas space was unusually deep and the passing of the first two tiers of sutures was attended with considerable technical difficulty.

The uterus was then ventrosuspended as high as it could be drawn up without undue traction. The appendix was removed as a prophylactic measure. Palpation of the gall-bladder revealed nothing abnormal. The left kidney was palpated and deemed to be in fairly good position and about normal size.

The abdomen was closed with tier sutures with considerable overlapping of the fascia. The patient withstood the operation very well. She is making practically an afebrile recovery. Of course it is too soon to say anything about the result, though thus far it was ideal; the uterus is high up and when the patient bears down there is absolutely no protrusion of the rectum. The anus opens up quite widely, but none of the rectal mucosa comes into view.

#### DISCUSSION.

DR. A. J. RONGY.—This is a very interesting case and I should have liked Dr. Vineberg to describe it more in detail. Complete procidentia in nulliparæ is very rare but I think our statistics on this subject are not correct. In a paper by Dr. Palmer Findley, he reported three cases in which the patients had consulted three other gynecologists and if these other gynecologists also reported the cases



they would go on record as eighteen cases, whereas they were really only three.

I do not know whether complete procidentia uteri in nulliparæ is due to spina bifida or whether to a deep culdesac as shown by the elongated cervix and short perineum. As a result of the lack of support we may get an early retroversion and then the intraabdominal pressure from above exerts an undue pressure on the uterus and it slides through the vagina. The cervix in these cases is usually elongated but I think not primarily so, but as the result of the malposition.

The question of operation in these patients brings up the subject of subsequent childbirth. I would take exception to the performing a complete hysterectomy in these cases as they generally are neurotic women and if the uterus is removed it makes them still more neurotic. It seems to me that the interposition operation is the better procedure in these cases.

DR. TOVEY.—There seems to be some congenital factor involved in the etiology of these cases. I have seen three cases, patients of Dr. Brooks Wells, occurring in the same family. The condition seems to be due to a congenital defect in the uterine supports. I do not think the interposition operation should be done in these cases. It is possible that these women may have children later on and it is not fair to sterilize a woman unless she has born children. I know that men perform hysterectomy in these cases, but it seems to me it is better to shorten the round and uterosacral ligaments and do a perineal operation and that when we have done this we have done enough.

DR. RABINOVITZ.—The case of procidentia in a nullipara presented by Dr. Vineberg interests me from the etiological point of view. I am sorry that the history of the case is so meager in points bearing upon the general physique and hereditary influences of this patient. Cases of procidentia in virgins and young girls have been reported in whom a spina bifida occulta has existed. In the case reported this evening it was absent. But how about her other organs, were they all in place? Ptosis—whether of the colon, the kidney, the stomach, or the uterus—must no longer be considered in the light of a pure mechanical defect in this class of patients, but as a result of a general constitutional defect, dependent upon disturbances in the endocrine system. Being in some cases purely gonadal, in others a combination of disfunction in a number of correlated glands of internal secretion. Viewed in this light, cases of the type presented by Dr. Vineberg will cease to have a mere mechanical interest, but will bring us into studies of a much wider and absorbing field of clinical gynecology.

DR. WEST.—Dr. Robert Dickinson has made a very full investigation of the etiology of procidentia and he takes the ground that procidentia in the nullipara is due to the shape of the pelvis. He states that the pelvic angle is nearly a right angle, is not directed downward to the normal degree, as a result the pelvic contents do not get the support of the pubic arch. This lack of support produces a

retroversion and then the intraabdominal pressure directed in the line of the opening stretches the tissues and the continued stretching and pressure finally forces the uterus through the opening.

All of the cases of procidentia in the nullipara are not associated with other deformities. I have had three cases, two of which I operated upon, and I found that the peculiar characteristic of these cases as compared to procidentia due to lacerated perineum was that the tissues were not so hypertrophic. The cellular tissue binding the mucous membrane to the parts beneath is greatly overstretched and the mucous membrane slides very readily on the tissues beneath. We have endeavored partly to overcome this by the production of scar tissue. My cases were not complicated by prolapse of the rectum but were simply procidentias.

Cases of this kind are entitled to an operative procedure which will cure them and if possible leave the functions of generation unimpaired.

DR. HOLDEN.—Some fifteen years ago I had a case of procidentia uteri in a nullipara. This patient cured herself of procidentia by developing a fibroid in the anterior wall of the uterus which drew that organ up high in the pelvis. Two years ago we did a supercervical hysterectomy with the elevation of the stump by the use of the round and broad ligaments, and she has been perfectly well ever since.

DR. VINEBERG, in closing the discussion, said: "I only wish to add in connection with what Dr. West has said in reference to Dr. Dickinson's study of this condition. Dr. Dickinson has given us a theory which Freund gave expression to years ago. I have not had time to work this case up and would like to have more time to study the case and look up the literature.

"The interesting point in this case is the prolapse of the rectum and the method by which it was cured. I operated for the prolapse of the rectum by the method devised by Dr. Moschowitz. In prolapse of the rectum this operation gives a very satisfactory way of getting into the abdomen and we then obliterated the culdesac of Douglas and brought up the uterus and did a ventrosuspension."

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SECTION ON OBSTETRICS AND GYNECOLOGY.

*Stated Meeting, Held February 27, 1917.*

DR. GEORGE W. KOSMAK, *in the Chair.*

DR. ARTHUR STEIN reported a case of

ATTEMPTED ABORTION IN THE ABSENCE OF UTERINE PREGNANCY.

Criminal abortion is steadily on the increase in all civilized countries and in view of the enormous number of self-induced abortions it is extremely probable that such attempts are often made where the fear of pregnancy is unfounded. Not only is *attempted*

*abortion in the absence of pregnancy not as rare* as is sometimes supposed but it is of considerable gynecological importance on account of the associated dangers which are even greater than those of criminal abortion where pregnancy actually exists. The subject has attracted very little attention in this country and its introduction into European gynecological literature is of relatively recent date. On closer investigation, however, an astonishingly large number of observations along this line will be found scattered through gynecological periodicals and according to the reported cases it is advisable to make a distinction between the two following groups:

(1) Cases of attempted abortion in which the uterus is empty and pregnancy does not exist.

(2) Cases of attempted abortion in which the uterus is empty but in which there exists an ectopic pregnancy.

The *very high mortality* (about 43 per cent.), according to recent and extensive investigations, is explained by the reckless repetition of the deluded woman's futile efforts to interrupt a fancied pregnancy.

In those women who are already endangered by the existence of an ectopic pregnancy, the sequelæ of attempted abortion are likely to prove especially serious, if not actually fatal.

The dangerous character of attempts to induce the premature expulsion of the ovum in an erroneously assumed pregnancy is illustrated by a personal observation at the Harlem Hospital, New York (Dr. Broadhead's service, on a para-v of forty-three years, near the menopause, who attributed a six weeks' retardation of the menstrual flow to pregnancy and adopted artificial means for its arrest.

The introduction of an alum stick into the uterus was followed by a chill lasting one hour and followed by fever. There was persistent vomiting for a day with general malaise. The patient complained of hypogastric pains and a considerable amount of bloody discharge was passed from the vagina.

When first seen, three days after the attempted abortion the patient was in a serious condition with a temperature of 102° F. and pulse about 120. The abdomen was tender and somewhat distended. On vaginal examination the anteflexed uterus was palpable, slightly enlarged and extremely tender, especially at one portion of the anterior wall. There was nothing abnormal about the parametria and adnexa. Diagnosis: Infected incomplete abortion (?). Therapy: The uterus was curetted under all necessary precautions. A small amount of tissue with a fetid odor was removed.

At night following the curettage the patient's temperature rose to 105.6° F. and three days later she died of general septic peritonitis. A postmortem examination showed no signs of an existing pregnancy, either macroscopically or microscopically. (The postmortem and microscopical examination was performed by Dr. Schulz, at that time coroner's physician.

Hypocritically we might say that this is a case of attempted abortion in the absence of pregnancy by a woman forty-three years of age who apparently mistook the beginning of her menopause for a beginning pregnancy.

DR. ARTHUR STEIN also reported a case of

LARGE MYOMA, COMPLICATING LABOR. DEATH OF MOTHER AND CHILD.

This patient, thirty-seven years of age, a primipara, was admitted to the Harlem Hospital with the following history given by the physician who had attended her up to that time. "Amniotic sac was ruptured seventy-two hours ago (Thursday, January 25). Slight pains began shortly afterwards, increasing on the afternoon of the first day, then disappearing, and returning again on the morning of January 28. There was a foul discharge from the vagina. No life had been felt since about twelve hours ago. No fetal heart sounds had been heard during the day. High forceps failed to engage the occiput. Two doses of pituitrin of one c.c. each were given at hourly intervals without inducing contractions. A diagnosis of large dead fetus was made. Forceps extraction was tried but was seemingly impossible."

Upon examination on January 28, at 11 P. M., the following condition was made out. The woman was in a good state of nourishment but extremely pale and pulse was between 110 and 120, temperature 101° F. Due to the fact that the patient had been under narcosis for several hours previous to her admission to the hospital, she was partially unconscious. Her pelvic measurements were normal. The spines were 22, the crests 30, and the external conjugates 21.5. There was marked edema of both legs and outer genitals, especially of the labia majora. On inspection a large tear of the perineum was seen, involving the sphincter and reaching into the rectum.

The external examination showed the uterus tetanically contracted, due apparently to the two above mentioned injections of one c.c. of pituitrin given before her admission to the hospital. Typical Bandl's ring was visible. The uterus was found to be lying away over toward the right side of the abdomen. There were no fetal heart sounds perceptible. Due to the tetanic contraction of the uterus no exact diagnosis of the child's position could be made.

The internal examination showed the above described perineal laceration which reached upward toward the cervix and was found to extend into the left paravaginal and parametrial tissue. The head was felt firmly engaged in the brim of the pelvis.

In consideration of the above described conditions, perforation of the head and extraction of the child was decided upon.

The perforation was easily performed, but upon the attempt to extract the child, in spite of the application of all kinds of appliances (regular forceps, basiotribe, etc.), it was found impossible to move the head as much as one-half an inch. The efforts to do so were continued unsuccessfully for about one hour after perforation.

When I saw the patient at this time, 1 A. M., January 29, the above described conditions were the same, the perforated head presenting. An effort to introduce a hand into the uterus and perform a version failed utterly, due to the tetanic contraction of the uterus which would permit no movement whatever of a hand inside of it. That also was one reason why an embryotomy was not performed.

Because of these unavailing efforts to extract the child, a differential diagnosis of a large monster or a tumor of the pelvis was made, but in consideration of the patient's history and the many vaginal and intrauterine manipulations which had been resorted to an abdominal Cesarean section was not regarded as the correct procedure in this case.

Another attempt to extract the child through the vagina was therefore made, with Dr. Langrock and myself pulling from below and Dr. Dover pressing downward upon the abdomen. This procedure was persisted in for about forty-five minutes and was finally successful. A Simpson forceps, after severe traction and pressure from above, brought the crushed head out of the vulva. At the same time hooks were placed in the axilla and the dead child was with great difficulty extracted. The child without the brain weighed seven pounds and five ounces. The placenta was quickly expressed and a rapid suture of the above described total laceration of the perineum was performed. The uterus was packed.

A large tumor was then found to be lying in the right side of the pelvis, extending into the larger pelvis where it could easily be felt.

The patient was placed at once in bed, stimulated in every way, and infused with a saline solution. In spite of all treatment, however, she died from shock, four hours after her confinement.

The postmortem showed the following findings:

"Skin very pale; edema of legs and vulva; abdominal cavity free from blood or fluid; intestines and stomach very markedly dilated and pale; vessels enlarged and tortuous; liver, spleen and other organs normal. The pelvis showed edema of the cellular tissue. The bladder was normal and stripped easily from the uterus. The uterus showed no perforations and was well contracted. The right half of the pelvis was filled by a fibroma occupying the whole of the right lower uterine segment. The adnexa were normal.

The specimen consists of the puerperal uterus. Attached to the right and posterior side of the cervix there is a myoma of the following dimensions: Length 6 inches, width 4 inches, and depth 3 inches.

The myoma is very hard, firmly attached to the uterus, and has developed upward in between the two layers of the broad ligament.

#### DISCUSSION.

DR. GEORGE L. BRODHEAD.—I am not sure whether I saw the first patient whose history Dr. Stein has reported, but I have had patients of that type, who not knowing whether they were pregnant

or not, decided to take no chances and attempted to have abortion. I remember one woman forty-seven or forty-eight years of age who thinking she was pregnant, but not actually being so, used some instrument and within two or three days became septic, finally dying of pyemia. We see at the Harlem Hospital many of these septic abortions and have had a few in women who were not pregnant.

The second case presented by Dr. Stein is interesting not only in itself, but also in that it brings out the importance of antepartum diagnosis. If this patient had been thoroughly examined before she went into labor the existence of the tumor might have been revealed and the Cesarean section performed. It also illustrates how one may lose a living infant by delay in making an accurate diagnosis. When the conditions were present as Dr. Stein first saw them, the problem was merely how to get the child out with the least trauma to the mother.

DR. ASA B. DAVIS.—Some eighteen or twenty years ago a patient came under my care for a short time. She gave a history of several previous induced abortions brought on by some one passing a sound into the uterus. This time this plan had been repeated daily for several days. I did not examine the patient but sent her to the Lying-in Hospital to the service of a competent surgeon. I was not then on duty. The patient was curetted. Evidence of abdominal hemorrhage was found, the abdomen opened and a ruptured ectopic pregnancy revealed. The operation was completed as well and expeditiously as possible. The patient died within forty-eight hours from sepsis, hemorrhage and shock.

DR. HIRAM N. VINEBERG.—I have seen so many cases of ectopic pregnancy in which abortion had been attempted that I even made the statement that these cases may have been made ectopic by the passage of sounds. At an early stage of conception, it seems possible that this theory may be correct, and that the passage of the sound may have something to do with the arrest of the passage of the impregnated ovum through the tube. Some of these patients confess to having had sounds passed when menstruation had been delayed only one day. None of the cases of this kind that I can recall had become septic and all as far as I can remember recovered after operation.

DR. GEORGE L. BRODHEAD reported two cases of

#### RUPTURE OF THE FETAL LIVER DURING BREECH EXTRACTION.

1. The patient was a primipara, aged twenty-six, with normal pelvis, one child presenting by the breech. The cervix became fully dilated, and the breech descended, but as the fetal heart was increasing in rate and as the mother's pulse was more rapid and she was becoming exhausted, extraction was performed. The legs were fully extended, but were brought down with considerable difficulty. There was a double nuchal hitch, and in the endeavor to extract the arms, the child's body was rotated in both directions several times. The arms were extracted and the head came out easily. The infant weighed 8

pounds 10 ounces and soon cried vigorously. Until a few hours before the child's death on the third day, its color was good, it nursed well and seemed to be doing nicely. Then the breathing became shallow, the child became very pale and death ensued. The autopsy revealed free blood and clots in the peritoneal cavity, and there was a rupture of the upper lobe of the liver just under the diaphragm, the capsule being ruptured over an area as large as a half dollar, about  $\frac{1}{4}$  inch of liver tissue being torn away. With such an extensive laceration, and with so much bleeding, it was remarkable that the child was apparently so well for the three days following birth. We are of the opinion that in all probability the rupture occurred during the manipulation of the body which was necessary in order to extract the arms, but no undue force was used. The trauma is unique in our experience, and is reported for its rare interest.

2. This interesting case I am able to report through the courtesy of Dr. Louis Friedman, one of my colleagues at the Harlem Hospital. The patient was a primipara, at full term, age twenty-five, who was in labor from Wednesday, January 10, at 5 A. M., until Thursday, January 11, at 10 A. M. The pelvic measurements were normal, the position was R. S. A., the os fully dilated, but as the pains were few and not strong, the child was extracted. The legs were extended, and were brought down, and the extraction was comparatively easy. The child nursed properly and acted like a healthy infant up to within a half hour of the time of death. There were no signs of hemophilia. The last nursing was at 12.30 P. M., January 14, and about an hour after that time the nurse noticed that the child was pale, and a half hour later he died. The autopsy was performed by Dr. C. S. Cassasa, to whom I am indebted for the following report: Rigor mortis complete, postmortem hypostasis scant. Lungs, serated throughout. Heart, left ventricle contracted. Heart fluid very scant. Umbilical cord normal. Abdomen contained about 6 ounces of fluid and clotted blood. Liver—entire renal impression of liver was occupied by fluid blood, the location of which was between the liver substance and the capsule. Examination of the capsule over this area showed a circular defect, about  $\frac{1}{16}$  of an inch in diameter. Gentle pressure over this collection of blood caused escape through the defect. A sagittal section was made through the diaphragm and liver. At the junction of the posterior layer of the coronary ligament to the liver, clotted blood and lacerated liver tissue were found. The laceration extended  $\frac{1}{2}$  inch in the direction of the ligament, its depth being about  $\frac{1}{32}$  inch. The other organs were normal.

Diagnosis: Traumatic laceration of liver, intraabdominal hemorrhage.

One of the most interesting features in this case, as in the preceding, was that the child lived three days with apparently no symptoms, and then suddenly died. Lesions of this kind would probably be found more often were autopsies more frequently performed, but one pathologist, Dr. Gonzales, with whom I have spoken, tells me he has performed a great many autopsies of newly born infants, yet

he has never seen a liver lesion such as this. Holt, in his text-book on children, refers to a case reported by Mendelson of New York, in which blood accumulated under the capsule of the liver, causing death from rupture into the peritoneal cavity on the third day. The author also states that "of the large hemorrhages, those into the suprarenal capsules are perhaps the most frequent." Ahlfeld has reported a case of hemorrhage into both suprarenals, and Runyon of Orange, N. J. has seen double rupture of the suprarenals in one of twins, which was born easily by the breech. In many of these cases, the child appears to be doing well, until the hemorrhage occurs into the peritoneal cavity.

#### DISCUSSION.

**DR. HIRAM N. VINEBERG.**—I recall a case of rupture of the liver in an infant. In this case the delivery was normal and the baby otherwise was normal. It died three days after birth and at autopsy we found a large hemorrhage from the liver. In this instance the hemorrhage was certainly not due to hemophilia as there was no such history in the family and the woman had given birth to other perfectly normal children.

**DR. GEORGE W. KOSMAK.**—If we could get more autopsies we would find that these cases occur more frequently than we have thought. I recall the case of a private patient in which the baby died suddenly and Dr. Losee performed the autopsy. He found a hemorrhage into the abdominal cavity. In this instance the delivery had been very precipitate and as sometimes happens in a precipitate delivery the baby was born in the bag of membrane. Dr. Losee attributed the hemorrhage in this case to asphyxia and his theory seems very plausible.

There is another point with reference to breech extractions. In view of the frequency with which the arms are extended, it is a safe rule to take for granted that this is the usual position and therefore as soon as the tip of the scapula is born to deliver the arms and in that way a good deal of traumatism may be saved.

**DR. ASA B. DAVIS** reported a case of

#### **FULL-TERM ABDOMINAL PREGNANCY WITH MACERATED FETUS: STREPTOCOCCUS INFECTION OF THE SAC AND OF THE UTERUS.**

The patient, Mrs. R. H., was admitted to the wards of the Second Division of the Lying-In Hospital, January 23, 1917. She was a native of Holland, thirty-four years of age and gave a good family history; she had had the usual diseases of childhood without severity or known complications. She had never had a severe illness, nor any operation, and had always been in good health, strong and able to do the necessary work of housewife and working housekeeper for others. Menstruation began at the fourteenth year, was regular, of the thirty-day type, continuing four or five days, moderately profuse and painless. She was married in 1900 and her first child,



which is now living and healthy was born in March, 1902, after a normal pregnancy, spontaneous labor, and the puerperium was uneventful. Lactation continued for seven months, when menstruation of the type above mentioned recurred and had continued at regular intervals until March 24, 1916, a period of fourteen years since her first and only pregnancy. She had had good health during this time except that about six years ago she was treated with tampons for what was said to have been "falling of the womb." She denied contraceptive methods.

Since the beginning of the present pregnancy there has been a rusty, mucus, vaginal discharge at intervals of a week or ten days, and especially at what should have been the dates of menstruation.

During the first three months there were almost daily attacks of nausea and vomiting. Reckoning from her last menstruation, she expected full-term delivery about January 1, 1917. Fetal life was felt from October, 1916, until January, 1917, but none since the latter date.

After the first three months of pregnancy there was no more nausea and vomiting until January 22, 1917, when she had three attacks, and again January 26, 1917 when she had two attacks. On the latter date she had an attack of faintness with partial loss of consciousness, continuing about fifteen minutes, and accompanied by nausea and profuse sweating. There is no history of any similar attack, nor of any injury or strain. A sense of unusual pressure in the abdomen had been noticed for the past two weeks.

During the past three weeks the reddish vaginal discharge, just short of bleeding had been constant.

Throughout her pregnancy the patient had been under the close observation of Dr. Emma Hackett, who sent her to the hospital on January 23d, with the tentative, but to her unsatisfactory, diagnosis of placenta previa.

The examination showed a white woman, medium size, thin and rather poorly nourished; her complexion was sallow and muddy. There was nothing worthy of note in the heart and lungs. The temperature was 99.2, pulse 100, and respiration 20. On the following day, January 24th, the blood pressure was 128. The urinalysis showed the urine amber, acid, specific gravity 1010, albumin present, urea 1 per cent. and a few granular casts.

Abdominal examination gave the impression of a full-term pregnancy. A large patch of brown pigmentation covered the epigastric region down to the umbilicus. There was no jaundice over the eyes. The transverse colon was much distended.

There were no uterine contractions, and a careful search failed to reveal fetal heart sounds or a uterine murmur. The dorsal plane was felt on the right side and ballottement was distinct to the left of the median line and umbilicus and above the left iliac crest. No fetal movements were felt. It was especially noted that palpation over the abdominal ovoid revealed marked tenderness and pain, particularly at the right and upper part.

Vaginal examination showed a multipara without evidence of much

laceration or relaxation. The cervix was high, rather to the left, soft not lacerated, admitted one finger, and was readily dilated to admit two fingers up to 4 cm. above the internal os. No membranes, fetal parts or placenta could be felt, nor would fundal pressure bring any fetal parts down to the touch of the examining finger; ballottement could not be obtained below. The examining finger was covered with material having the appearance of incomplete abortion.

This patient did not appear very ill and was kept under observation. On January 25th, she remained about as when admitted; the temperature was 100.2, pulse 110, and respiration 28. In the late afternoon of January 26th more distention of the upper part of the abdomen was observed. On January 27th the temperature was 101.4, pulse 140, and respiration 32. The blood pressure was 130. Blood examination showed: red cells 3,810,000, hemoglobin 68 per cent., color index 0.6, leukocytes, 21,200, polymorphoneutrophils 91. The x-ray examination gave little assistance. Photographs were taken.

The abdomen was now tense and evenly distended up to the ensiform, with stretched and shiny skin. There was no bleeding from the vagina.

At this time we were fortunate in having with us Dr. Ziegler of the Magee Maternity, Pittsburg. The diagnosis then made rested between a uterine pregnancy past full term with gas bacillus decomposition, or an abdominal overdue pregnancy with like decomposition of the fetus, etc. Dr. Ziegler had recently treated the former condition. Against the first theory above cited was the fact that no membrane could be felt in the uterus although the examiner's fingers were carried well above the internal os; gas contained under such great pressure should have bulged the membranes downward so that they would have been felt readily at the internal os or lower.

Under ether anesthesia the uterus was curetted with a large dull instrument. The cavity was roomy, about 17 cm. deep and crowded well over into the left iliac fossa. It was empty save for a considerable amount of grumous material, old clots and fibrin mixed with clots; it had the macroscopical appearance of material removed in the case of incomplete abortion of rather long standing. The uterine wall was soft and the curet did not readily come down upon firm muscle. The uterus was swabbed out with half strength tincture of iodine.

The abdomen was then opened by a midline incision about 16 cm. in length, equidistant above and below, and slightly to the left of the umbilicus. No intestines or omentum came into direct view at any time. An ovoid mass, dark, dirty green in color, filling the whole abdomen and adherent to the abdominal wall presented. The wall of this mass appeared to be of considerable thickness and under great tension. The abdominal wall on the right side was stripped away from the mass with the fingers for a short distance along the whole length of the wound. Then separation on the left side was in progress and had been carried to a little more than the width

of the hand and as far back and down to the left as the fingers could readily reach, when there was a sudden hissing report, quite loud and similar to those familiar to the automobilist. It was then found that the sac had ruptured at its upper mid-portion anteriorly, and a large quantity about two liters in all, of dark, thin, foul-smelling fluid was escaping. Cultures were taken, and a culture was also taken from the uterine cavity before curettage. In each instance the laboratory reported streptococcus viridans; no gas bacilli were found. The opening in this sac was enlarged to the full length of the abdominal opening. A well-formed female fetus was lying with breech above and to the right, dorsum right, curled down to the left with vertex left and below at the site where ballottement had been found prior to the operation. The fetus was not much decomposed. It was removed and the placenta was found spread out over the lower and right portion of the cavity, adherent to the cecum and neighboring intestine and the abdominal wall. The entire wall of this cavity was of a dark, dirty greenish color. It was washed out with normal saline solution, and the cut edges were secured to the edges of the abdominal wound all around with a continuous plain gut suture. A silkworm suture closed each angle of the abdominal wound and the cavity was packed with 5 per cent. iodoform gauze, the remainder of the wound having been left wide open and covered with a thick gauze dressing held with adhesive straps and binder.

Neither uterus nor tubes came into view. It is impossible therefore to say what if any changes have taken place in them. This was probably an early tubal abortion. A history of sterility over a considerable time is quite apt to be found in cases of ectopic pregnancy. There was marked abdominal distention especially in the upper part of the abdomen. This developed almost entirely within twenty-four hours prior to the operation. The outline of the not tensely distended transverse colon was easily visible.

*Subsequent History.*—The patient was returned to bed not seriously shocked, the temperature being 99°, pulse 140, fair quality and regular, and respiration 32. After the first day the temperature ranged rather evenly under 100°, pulse 110 to 115, and respirations 26 to 34 until the sixth day. There was moderate soft distention of the abdomen for a few days, and diarrhea for about forty-eight hours from the third day.

The abdominal packing was removed after forty-eight hours, leaving a deep well-like cavity with dry walls. This was lightly packed with gauze. Thereafter sloughing was active, with profuse discharge, requiring several dressings each twenty-four hours, with irrigation with salt solution each time. Gradually the abdominal contents pushed the walls of this cavity downward and from behind forward, everting the sac and yet retaining it wholly within the abdominal cavity. Soon one could feel through the placenta that it was becoming detached more and more in several different areas. There was little change in the pulse, temperature and respiration save for moderate rises of short duration from the

sixth until the nineteenth day. On this day large areas of separation of the placenta were evident. There was moderate bleeding which ceased soon under light packing. The temperature rose to 103, pulse 140, respiration 32. This temperature gradually subsided until on the twenty-third day it reached 99, and the respirations 18 to 24, where they had continued with very little variation until now, the forty-third day; the pulse, however, had been rather constantly near 120 since the twenty-third day. The cavity is of very small capacity and the abdominal wound will only admit one finger. The patient sits up in a chair for about two hours each day, has a good appetite, and all of her functions have been well maintained throughout. The urine had shown a marked trace of albumin with hyaline casts and for three or four days there was bladder irritability which has much improved.

On March 7, 1917, the patient's blood count shows 2,940,000 red cells, hemoglobin 58 per cent., leukocytes 17,200, polynuclears 75 per cent. Early recovery is now looked for though it is possible that an abdominal hernia may develop later at the site of the wound. This can be easily dealt with. Had the sac and placenta been removed at the time of the operation, it is probable that the patient would not have survived more than a few hours.

#### DISCUSSION.

DR. VINEBERG.—I have had an experience of this kind. The woman went to full term and beyond and the diagnosis was made in a hospital of this city (where she had been for several days for observation) of an inoperable malignant growth. When the patient consulted me a month later, it was not difficult, with the history given and the physical signs to make a correct diagnosis. I operated upon her at the Mount Sinai Hospital. The placenta was adherent to the abdominal wall and the hemorrhage was very profuse but by working rapidly I ligated the main blood-vessels and thus controlled it. I was then able to remove the placenta entire but the membranes were exclusively adherent. I sutured them to the parietal peritoneum and packed the cavity with iodoform gauze. The fetus was dead. It weighed over 9 pounds. The patient made a satisfactory recovery.

DR. A. J. RONGY.—Dr. Davis' case recalled an interesting case that came under my observation recently. This woman was about twenty-five years old, married four years, was operated on by me for ectopic pregnancy about two and one-half years ago. Eight months later she returned and upon examination I found her about three months pregnant. I again examined her in the sixth month of pregnancy and found her condition normal. In the seventh month she had a severe attack of sharp pain in the abdomen; a neighboring physician was called in and he gave her some morphine hypodermatically. The following day she felt better but she did not feel any fetal movements. During the eighth month she came to New York (patient lived in Bridgeport) to consult me about her

condition. On examination she presented a clinical picture of a woman who is in the eighth month of her pregnancy. She suffered no pain or tenderness anywhere. Fetal heart sounds could not be elicited after a most thorough examination. I then informed her that the fetus is most likely dead and that she should wait ten to fourteen days and if labor did not set in it should be induced. Ten days passed and there were no signs of labor and according to her history the fetus was dead nearly a month. I had her admitted to Lebanon Hospital for induction of labor. After the usual preparation I inserted a large catheter into the uterus and packed the cervix with gauze but labor failed to set in. I removed the catheter and packing at the end of twenty-four hours, gave her a rest for twenty-four hours and reintroduced a catheter and packing of the cervix but labor still failed to set in. At the end of twenty-four hours the catheter and packing were removed and under a general anesthetic a No. 2 Barnes bag was introduced. This was later followed by two doses of pituitrin. She had some slight pain in the abdomen but labor did not ensue. The bag was expelled at the end of eighteen hours and the patient apparently felt well.

I did not wish to suggest a major surgical operation at that time and I advised the patient to go home and return to the hospital as soon as she noticed labor pains setting in. She remained at home two weeks during which time I saw her twice. She was readmitted to the hospital after she was convinced that labor would not set in of its own accord. She was again prepared for induction of labor. At this time I informed the family that labor could not be induced because the child might have escaped from the uterus at the time when she took ill in the seventh month of pregnancy and when she ceased to feel the fetal movements. In order to reassure myself on that point I thought it advisable to examine her under a general anesthetic, to dilate the cervix and make a digital exploration of the uterine cavity. On attempting to dilate the cervix a great deal of bleeding was encountered. The cervix was quickly packed and the patient returned to bed. Two days later I decided upon an abdominal operation. On opening the abdomen a large amount of fluid escaped and a full-developed fetus weighing about 6 pounds was found floating in the abdominal cavity. The placenta, hard, dry, pale and shriveled was found to be attached in the region of the right kidney. There was no evidence of fetal membranes. The abdomen was closed and the wound drained at its lower angle. The patient made an uneventful recovery.

I shall not, at this time, enter into a discussion whether this condition was primarily a tubal abortion with a subsequent abdominal pregnancy or a rupture of the uterus during the seventh month of pregnancy and the escape of the fetus and the placenta into the free abdominal cavity. I shall at some future time make a complete report of this case with all the pathological findings. For the present, however, I am inclined to believe that the uterus ruptured spontaneously during the seventh month of pregnancy.

DR. BRODHEAD.—We have had one case of abdominal pregnancy in the hospital that died without a diagnosis having been made. At autopsy, an extrauterine pregnancy was found. A case of which I have heard recently shows the difficulty of making the diagnosis in some cases. This patient gave a history of having gone through a normal pregnancy. She was examined by the house staff of the maternity hospital and they thought she had a normal uterine pregnancy. However, she went beyond full time and an attempt was made to induce labor. The obstetrician tried to introduce de Ribes bags but could not do it successfully and it was decided to perform an abdominal section. Upon opening the abdomen they found what seemed to be an ovarian cyst. It was easily separated from the surrounding viscera and the vessels were tied off, and the specimen laid aside as an ovarian cyst. Later on someone opened the specimen and found a seven and one-half months' macerated fetus. That woman was examined by a number of experienced obstetricians, and not one had made the correct diagnosis until the sac was opened.

DR. VINEBERG.—In abdominal pregnancy the uterus enlarges to a size corresponding to that of a uterine pregnancy at about the fourth month.

DR. DAVIS, in closing.—Within the past five or six years I have seen three other full-term or over abdominal pregnancies operated upon by other surgeons in the Lying-In Hospital. The first two mothers recovered and I believe one child. In the third case the child was dead before operation and the mother died shortly after from shock. In all three cases the entire sack and placenta were removed at the time of operation and the abdomen closed. I do not remember whether drainage was used.

Apparently none of these cases were infected. Some ten years ago I removed a five months' abdominal pregnancy with sac and placenta intact, closed the wound, and the mother recovered without difficulty.

Local abdominal tenderness under pressure is a rather constant symptom in abdominal pregnancy.

DR. EDWARD A. SCHUMANN of Philadelphia read by invitation a paper entitled

#### GENERAL OBSERVATIONS ON ANTENATAL PATHOLOGY.\*

##### DISCUSSION.

DR. J. R. LOSEE.—I am sure we have all enjoyed the very complete manner in which Dr. Schumann has delivered this paper. We see many abnormalities of excess and defect, which have been grouped under embryological pathology. This branch of antenatal pathology is being very carefully studied by Dr. F. P. Mall, of Johns Hopkins. The various observers have all carefully described the anomalies and have made complete histories; but the reason why

\*For original article see page 953.

certain parts did not completely develop has been explained by many different and opposing theories. The pathology of the late fetal period is practically the same as that of the postnatal period, for the disease has been transmitted from the maternal organism in most instances.

Syphilis is a well-known cause of premature labor, and dead fetuses in from 40 to 50 per cent. of the cases. But how can we explain the remaining 50 per cent.? It seems that in some there is a mechanical cause, or some pathological condition of the decidua, which prevents the placenta from remaining firmly attached to it. Such diseases as fetal anasarca, ascites and the many congenital bone conditions all await a satisfactory explanation as to their cause.

DR. S. W. BANDLER.—I would like to say a few things *apropos* of Dr. Schumann's paper. It is really a privilege to hear such a lucid and scientific paper. But if this paper is to be of real value to us or to the advancement of the science of eugenics we must not be satisfied with what we learn from the minute pathology of disease, but we must also look at the gross facts and see what they can teach us. If this paper means only that the embryo has certain defects and tells us only why we have an embryonic monster its value would be limited. But syphilis has been mentioned and alcoholism has been mentioned and heredity has been mentioned, and we were told of the importance of getting a family history. That does not mean a history of cleft palate or webbed feet merely and a passing by of the important things. In the science of eugenics we do not want to know simply whether the parents are syphilitic or alcoholic, but we want the family tree as it goes back a few generations and we want to know a great many facts. To know whether the parents have had hypothyroidism, Basedow's disease, or myxedema, are all important things which we want to consider. We say hereditary syphilis is important, yet the embryo may be so well formed and so apparently healthy that no one would know or suspect syphilis. I can count on the fingers of my hands the children that I have seen that have shown definite signs of syphilis at birth, yet we were told in college that these children were born with the evidences of syphilis on the palms of their hands and the soles of their feet. These syphilitic children may grow up without definite symptoms of syphilis; they may have only symptoms of digestive disturbance, a tendency to develop fever easily, they may simply be delicate and sickly. If the embryo can survive the syphilitic involvement it requires more things than we may suppose to affect it. A placenta previa has an abnormal implantation of the placenta and I doubt if that makes any difference in the way in which the fetus develops.

The spermatozoan does not carry syphilis into the ovum. If a woman gives birth to a syphilitic child it is because she herself is syphilitic. It is possible for a man to have syphilis and yet to have perfectly healthy children unless the mother herself is made syphilitic. I know that the idea formerly was that the spermatozoa carried the spirochete to the ovum and infected it, but we have found that this is incorrect.

When it comes to alcoholism we know that alcohol is one poison that does injure the embryo and we also know that alcoholics are not normal individuals, that they are individuals below normal, and consequently they are more likely to become alcoholic than the average person. If, then, the offspring of an alcoholic individual is defective we attribute it erroneously to the alcoholism of the parent instead of to the defective heredity, although I believe the alcoholism in the mother has something to do with it. Probably we can point to a central pathology in these individuals. On whatever line we may study this subject there are two sides; we have the antenatal changes which include the few changes visible in the baby and when it lives the influence that hereditary factors have all through life, even until the individual reaches seventy years of age.

DR. SCHUMANN, in closing.—I appreciate the reception which my paper has met. It is just such questions as have been asked and such speculations as have been made by Dr. Bandler that show what we require. None of the students of this subject have come to any definite conclusions on these matters. Our great need is more data, and more data, and still more data. It has been well said by Dr. Holmes that we should treat the defects of the child by treating those of the grandfather and grandmother.

As to infection of the ovum by the treponema, I have just recently looked up the literature, and thus far there has been no demonstration of a treponema in the spermatozoan. Indeed it is difficult to see how a spermatozoa could carry a treponema into the ovum in view of the size of the treponema as compared with that of the spermatozoa. But there is a growing belief that in the life cycle of the treponema there is a granular stage and it has been guessed that possibly the spermatozoa might carry these minute granules into the uterus and thus infect the mother. There is no proof of this but it is an interesting theory.

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## REVIEWS.

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**THE NEWER METHODS OF BLOOD AND URINE CHEMISTRY.** By R. B. H. GRADWOHL, M. D., and A. J. BLAIVAS. Pp. 240, with 65 illustrations and 4 color plates. St. Louis: C. V. Mosby Company, 1917.

The authors have attempted to make their book as concise and practical as possible by selecting from the technical literature a series of tests, usually only one for each substance, which they have found most useful. The volume opens with directions for the installation of a blood and urine chemical laboratory, with lists of the apparatus and chemicals required for each test. Instructions for obtaining and handling the blood are followed by chapters on the technic of each blood chemical test and by others on urinary chemical tests and microscopic examination. The Hellige colorime-



ter is described and recommended as most practical owing to its relative cheapness and the small amount of fluids needed in its use. The rest of the work is devoted to a discussion of blood findings and their interpretation, taking up the interesting topics blood sugar, acidosis, and blood changes in gout and nephritis. To those who have been waiting for a simple presentation of these subjects a new and important world is opened. This part of the book will interest those who do not wish themselves to undertake the laboratory work.

**FOOD AND THE PRINCIPLES OF DIETETICS.** By ROBERT HUTCHINSON, M. D. EDIN., F. R. C. P., Physician to the London Hospital, etc. Pp. 617, with plates and diagrams. Fourth Edition. New York: William Wood and Company, 1917.

This book was based originally upon the writer's lectures to the students of the London Hospital. It contains much to interest any reader and its discussion of food values can teach many facts of economic value in these days of high and rising prices. Though written in England it contains many references to American analyses of food stuffs and it is only in its descriptions of patent and proprietary foods that its British origin is especially evident. The changes in the present edition are confined almost exclusively to remarks upon vitamins and the addition of a number of new analytical tables. Alterations have also been made in considering the nutritive value of vegetable foods, the mineral constituents of wholemeal bread, infant feeding with cow's milk and the non-absorption of proteins from nutrient enemata.

**ANATOMICAL NAMES, Especially the Basle Nomina Anatomica ("BNA").** By ALBERT CHAUNCEY EYCLESHYMER, B. S., PH. D., M. D. Assisted by DANIEL MARTIN SCHOEMAKER, B. S., M. D. With Biographical Sketches, by ROY LEE MOODIE, A. B., PH. D. 764 pages, illustrated by numerous wood engravings and by two full-page plates in red and black. New York: William Wood and Company, 1917.

The purpose of this volume is to familiarize its readers with 5000 international BNA terms and so to discard over 45,000 synonyms which have gradually crept into medical literature. The list of BNA terms is made accessible by an index which contains these terms and many of their synonyms cross-indexed. A biographical list containing about eight hundred sketches of leading anatomists is inserted.

## BRIEF OF CURRENT LITERATURE

### GYNECOLOGY AND ABDOMINAL SURGERY.

**Eclampsia the Result of Intracranial Pressure.**—Zangemeister (*Zeitschr. f. Geburtsh. u. Gynäk.*, Bd. lxxix, Hft. 1) has frequently referred to the marked resemblance between the cerebral symptoms of eclampsia and the phenomena which may be experimentally produced in animals through increased intracranial pressure. In addition the author demonstrated by a trephining operation in several cases of eclampsia that a marked edema of the brain was present. This anomaly we may find during pregnancy associated with other parts of the body and the edema of pregnancy if localized in the brain constitutes an etiological factor in the production of eclampsia. Zangemeister has demonstrated the subject further and claims that the eclamptic phenomena force us to the conclusion that an increase in intracranial pressure is the cause of the same, which is shown by the results of treatment, especially the favorable effect of emptying the uterus, the alleviation of symptoms following venesection, the use of narcotics, etc. The author believes that if the early symptoms of intracranial pressure can be determined an effective prophylaxis as regards eclampsia will be possible.

**An Excess Male Birth Rate during War.**—Siegel (*Zentralbl. f. Gynäk.*, No. 42, 1916) discusses this subject with reference to the supposed preponderance of the birth of male children which followed the war of 1870. An investigation of the official vital statistics showed that the relation between boys and girls was practically the same and yet the popular idea seemed to favor a different version. Siegel has carefully investigated the births at the Freiburg Maternity Clinic and believes that in those pregnancies where the result is undoubtedly influenced by war conditions that the males preponderated in the number of births. He believes that this tendency can be shown to be more marked among married couples that have been separated for a time owing to the presence of the husband at the front and among 287 cases collected there were 154 boys and 133 girls, a proportion of 100 girls to 115.8 boys.

**Eclampsia Associated with Tubal Pregnancy.**—Ebeler (*Zentralbl. f. Gynäk.*, October 28, 1916) describes the case of a primipara twenty-three years of age admitted to the hospital with a diagnosis of ruptured tubal pregnancy. The patient had previously been curetted for continuous bleeding. An immediate operation was done and the right impregnated ruptured tube removed. Within a period of ten hours the patient developed well-marked convulsive seizures and an examination of the urine showed 15 per cent. albumin together with casts. The Stroganoff treatment was employed but the patient

died the next day with evidences of primary edema. In this case the pregnancy was probably not over six weeks. Among fifty cases of eclampsia in the early months of pregnancy, collected from the literature, there were only three extrauterine pregnancies. These cases are particularly difficult to diagnose and the early period of pregnancy at which they occur fails to explain the etiology of this condition.

**Examination of the Postoperative Results of Ovarian Tumors.**—Maunu af Heurlin (*Finska Läkarsällskapets Handlingar*, September, 1916) has made a study based on histological examinations of the material from Engström's Clinic in Helsingfors. Among 688 undoubted cases the fibromyoma were 1.9 per cent. and the sarcoma 3.6 per cent. The author did not find any endothelioma in this material. Among the sarcomata there were sixteen (64 per cent.) of the spindle-celled variety and nine (36 per cent.) of what he calls malignant sarcoma formations. Among the latter there were six cases of round-celled sarcoma, one case of polymorpho-celled sarcoma and two cases of hemangiosarcoma. The primary operative mortality for the fibromyomata was 7.7 per cent.; for the spindle-celled sarcoma 12.5 per cent. and for the malignant cases 33.3 per cent. The author states, however, that in each case there were individuals in very bad condition. The cure was, of course, permanent in the fibroid cases but among the spindle-celled sarcoma he found only 54.7 per cent. remained free from recurrences. Among the six cases of malignant tumor that recovered from the operation four died from recurrences within a period of seven months. In all cases only one ovary was removed where the other was found macroscopically sound.

Comparing these figures with the total population the author finds that one case of ovarian tumor is operated annually in about 20,000 inhabitants. A population of about 1,000,000 individuals develops one case of ovarian fibroma; 800,000 individuals one case of spindle-celled sarcoma and 1,500,000 individuals one case of malignant ovarian sarcoma annually.

**Fatal Complications of Percy's "Cold Iron" Method in the Treatment of Inoperable Carcinoma of the Cervix.**—The primary effect of the Percy cautery is to cause a neurotic mass extending more or less uniformly in all directions from the coagulating point. A mass of sloughing coagulated tissue of this type offers an ideal medium for the growth of microorganisms. This is borne out by the sections of two cases reported by V. N. Leonard and A. B. Dayton (*Surg., Gyn. and Obst.*, 1917, xxiv, 156). It probably will be found impossible to prevent infection of this area, and once infected, the thrombosed vessels of the region may offer a ready entrance into the system. Therefore the danger of a septicemia is considerable. Although convinced that fatalities must have been frequent, the writers have found only one completely reported. In this and in their own the Percy technic was applied most rigidly. Nevertheless, microscopic sections showed active uninjured carcinoma respectively four, eight, and sixteen days afterward. In both of their

cases it was found within 1 centimeter of the previous site of the heating iron. They conclude that the prolonged treatment of large carcinomatous masses by low heat may result in a rapidly fatal outcome with lesions similar to those in cases of fatal cutaneous burns. The necrotic mass produced by the cautery forms a particularly favorable medium for bacterial growth. The organisms may spread to the surrounding tissues or reach the general circulation through the local thrombosed vessels. It seems probable that the greatest danger in the application of the Percy cautery is a local infection and a subsequent general sepsis. Finally, the technic is ineffectual in eradicating the carcinoma. There is no evidence from these two cases that carcinoma is more susceptible to heat than is normal tissue.

**Hypertrophic Ileocecal Tuberculosis.**—H. Gage and E. L. Hunt (*Bost. Med. and Surg. Jour.*, 1917, clxxvi, 259) insist that in all cases of mobile tumor in the cecal region, we should keep in mind the possibility of its tuberculous character, and should always be prepared to deal with such a tumor if it should be found. They report two such cases. They present considerable difficulties in diagnosis. The onset is slow, gradual and usually associated with vague indefinite pains in the right iliac fossa, and symptoms of intestinal indigestion. At this stage it is practically impossible to rule out a chronic appendicitis. When to these symptoms are added an increasing constipation, with attacks of colicky pain, and the discovery of a movable tumor, the probability of malignant disease with stricture is at once suggested. At any period of the disease the possibility of tuberculosis of the ileocecal glands must not be overlooked. A family or personal history of tuberculosis should, of course, arouse the suspicion of the same lesion when trouble is suspected in the region of the cecum. After middle life, in the cancerous age, it is probably impossible to distinguish beforehand between tuberculosis and cancer in the presence of a mobile tumor of the cecum with symptoms of increasing obstruction. In the uncomplicated cases of hypertrophic ileocecal tuberculosis, resection should be the operation of choice, and if the patient is in good condition a primary resection with lateral anastomosis is certainly much easier, requires less exposure of the abdominal contents and less manipulation than a two-stage operation. When the tumor is fixed, when pus is present, and when the patient's general condition demands quick action with as little manipulation as possible, it is necessary to leave the disabled and diseased gut behind.

**Pain due to Anatomical Deviation of the Ureter.**—Among the cases which complain of recurring pain in the hypochondrium and lumbar region, often extending downward to its lower right or left abdominal regions, are those suffering from anatomical deviation of the ureter. The cases of anatomical deviation of the ureter include chiefly those due to high implantation of the ureter into the renal pelvis, twists and kinks of the ureter due to undue mobility of the kidney and the first portion of the ureter, and the very im-

portant class of cases in which a set of aberrant blood-vessels cross the ureter and enter the lower pole of the kidney and form a loop over which the ureter bends and becomes obstructed. The cases reported by P. Pilcher (*L. I. Med. Jour.*, 1917, xi, 1) include two of aberrant vessels. Argentide pictures showed kinking of the ureter opposite the kidney and a typical egg-shaped pelvis which is pathognomonic of an intermittent hydromyelonephrosis, due to constriction or aberrant blood-vessels.

**Uterine Prolapse, Rectocele and Cystocele.**—R. T. Frank (*Surg., Gyn. and Obst.*, 1917, xxiv, 42) says that with very few exceptions, anterior and posterior colporrhaphy combined with either the Alexander operation or ventrofixation are applicable to all cases of prolapse or cystocele and retroversion both during and after the child-bearing period. The technic of these plastic operations can be learned as precisely as that of inguinal hernia, if the student is taught the regional anatomy. To obtain the proper dimensions of the reconstructed canal, however, requires considerable experience and proficiency in operating. The disadvantage of the technic described by the writer is the considerable time required. A rapid operator cannot complete curettage, amputation of the cervix, anterior and posterior colporrhaphy, ligation of the tubes, and ventrofixation in much less than ninety minutes. In some cases (though very rarely) it may prove advisable to perform the vaginal plastic and the abdominal fixation at separate sessions (two weeks interval). Even old women stand this extensive operative interference surprisingly well. Only in the few cases where the general condition of the patient is precarious must interposition of the uterus or vaginal hysterectomy be given the preference, because of the shorter time necessary in their execution. The interposition operation is simple, but its disadvantages (necessity for sterilization, bladder symptoms, recurrence of protrusion after operation for prolapse) have become increasingly apparent. The suture of the isolated levator muscle is illusory, and, even when the cosmetic results are good, a painful scarry perineum is often noted. The technic described in this article, which for repair of cystocele utilizes the pubocervical ligaments and anterior fibers of the cardinal ligaments, for repair of rectocele unites the fasciæ of the rectum, the fasciæ of the levator muscle, and the triangular ligament, is very generally applicable, the exceptions being few and easy to recognize. Sterilization is not a prerequisite to the operations. The repair of enterocele and high rectocele is also described. Operations for these rarer conditions are more difficult and atypical. Recurrences must be expected in at least as many cases as follow hernia operations (in general 1 to 10 per cent.).

**Hematocolpos, Hematometra and Hematosalpinx in a Woman of Seventy-four Years.**—The case recorded by G. Gellhorn (*Surg., Gyn. and Obst.*, 1917, xxiv, 37) was a woman of seventy-four who had menstruated normally until thirty-five years previously, and in whom severe pain, pointing to obstruction of the urinary flow, led to the detection of a large fluctuating tumor which filled the entire

pelvis and extended upward almost to the umbilicus. The vagina was occluded by senile atresia. Laparotomy in spinal anesthesia revealed the tumor to be an enormous hematometra and hemato-colpos with bilateral hematosalpinx. Panhysterectomy was performed successfully, and the tumor which was connected with the vagina only by loose connective tissue was removed unopened out of its bed. Convalescence was undisturbed; the patient left the bed on the twelfth day after operation but succumbed to an embolism on the fifteenth day. The cause of bleeding into the occluded genital tract was an adenocarcinoma of the body of the uterus.

**Acute and Subacute Perforations of the Stomach and Duodenum**

E. P. Richardson's (*Bost. Med. and Surg. Jour.*, 1917, clxxvi, 158) paper is based on 104 perforations occurring in 103 patients. These give no evidence that pyloric obstruction is a factor increasing the primary mortality which might be avoided by an immediate gastroenterostomy. Gastric perforations carry a distinctly higher mortality than duodenal. The mortality of both gastric and duodenal perforations is high after middle life. One-half the cases of perforation, treated by suture alone, were apparently cured following operation. Therefore, an additional gastroenterostomy may well be avoided in cases of gastric perforation, in patients beyond middle life, and in any case where the general condition or elapse of time since perforation suggests possible death from peritonitis. This series suggests, that for the average surgeon, at least, the rule should be to close the perforation, and the exception to add a gastroenterostomy.

**Diverticulitis of the Descending and Pelvic Colon.**—J. W. Keefe (*Bost. Med. and Surg. Jour.*, 1917, clxxvi, 271) says that inasmuch as the location of the region involved and the period of life at which the condition occurs are identical with those of malignant growths, the differential diagnosis between these two conditions becomes difficult and is of paramount importance. Other conditions to be differentiated are: left-sided appendicitis, and tuberculous and luetic growths. The x-ray examinations afford a most valuable aid in diagnosis and are of especial value in differentiating between diverticulitis and carcinoma. In deciding on the type of operation to be performed in a case of diverticulitis, the one fundamental principle which should guide the surgeon, should be that of conservatism. Statistics have shown conclusively that extensive resections of intestine, done in the presence of infection, as is always the case in operations for diverticulitis, are, in a large percentage of cases, fatal.

**Ileostomy for Ileus and General Peritonitis.**—The method of operative procedure employed by J. W. Lane (*Bost. Med. and Surg. Jour.*, 1917, clxxvi, 304) in cases of acute general peritonitis due to a ruptured appendix is as follows: A rapid incision through the right rectus muscle or a McBurney, whichever can be performed more rapidly, is made. If the appendix cannot be removed in less than two minutes it is permitted to remain. A drain is placed to the pelvis and loin and a loop of small intestine, the most easily accessible, is drawn out of the wound and held outside the skin, which is closed

snugly but without constriction around the loop and the wick. In the course of one hour, this bowel, through the formation of lymph exudate, is absolutely sealed off from the rest of the abdominal cavity. If, at the end of six hours there is persistent vomiting and bowel movements are unsatisfactory, an opening is made in the exposed loop of gut. If free flow of that intestinal contents does not take place at once, it is started by irrigation with salt solution. A "semipermanent" ileostomy is the method which he uses for the ileus of peritonitis, and it is also the method which he intends to use in cases of postoperative ileus when it becomes evident or even doubtful that other methods of treatment are going to fail. In acute intestinal obstruction, the technic must be varied somewhat according to the cause of the obstruction.

**Blood-pressure Changes Induced by Hot and Cold Applications on and within the Abdomen.**—By experiments on cats, F. S. Hammett, E. W. Tice and E. Larson (*Jour. A. M. A.*, 1917, lxviii, 621) found that the application of heat to the external abdominal surface produces a rise in blood pressure, while the similar application of cold has but little effect, any change occurring being in the direction of an increase. On the other hand, the application of both heat and cold within the abdomen invariably produces a sharp fall in blood pressure followed by a slow recovery to normal when the stimuli are removed. When the abdomen is packed internally with ice after certain operations, care should be taken to determine the blood pressure level before the application, inasmuch as a marked fall of blood pressure, which is sure to be occasioned by this measure, might well be an extremely dangerous occurrence.

**Lymphogenous Ascending Infection of the Urinary Tract.**—While infection of the bladder or lower ureter may reach the renal pelvis or the kidney either by way of the lumen of the urinary tract or by way of the mural lymphatics, experimental and clinical evidence indicates that complete or almost complete obstruction to the urinary outflow is necessary for ascent of infection by way of the lumen of the urinary tract. D. N. Eisendrath and O. T. Schultz (*Jour. A. M. A.*, 1917, lxviii, 540) have shown experimentally that in the absence of complete obstruction the infection may and does pass upward from the bladder by means of the lymphatics of the ureteral wall. Depending on the virulence of the organism and on the susceptibility of the host, the involvement may remain limited to (1) the bladder and ureter, (2) it may pass upward to the pelvis, or (3) it may invade the renal tissues. When the kidney itself becomes involved, the inflammatory agent is carried from the renal pelvis to the parenchyma by the lymphatics of the intertubular and perivascular tissues. In the human being the lymphatic network constitutes the most important path of ascending infection when pyelitis or pyelonephritis follows cystitis not associated with complete obstruction to the urinary outflow. In the absence of cystitis the renal pelvis or the kidney itself may become involved by the transport of infection from the pelvic organs or from the lower intestinal tract through the anastomosing lymphatic channels, which anatomic study has shown to be present.

**Frequency of Urination in Women.**—Dividing 1000 cases of frequency of urination in women into nine groups according to the decade of life in which they occurred, H. G. Bugbee (*Jour. A. M. A.*, 1917, lxviii, 693) finds that urinary frequency during the earlier age periods is associated with acute infections much more frequently than in the later periods, which infections, in a large proportion of cases, are localized in the urethra and trigon, and which if not properly treated go on to stricture formation. These are cases which, in the past, have been treated as cystitis. Tuberculosis is not found in the first age period, nor is it found in the last four age periods. Intermittent attacks of vesical irritability are of common occurrence, accompanying colon bacillus pyelonephritis. The relatively common occurrence of frequency of urination following postoperative catheterization forces the conclusion that this procedure, as commonly practised in hospitals and dispensaries, calls for radical improvement, both as to technic and as to instruments employed. Calculi are comparatively common, in the ureter in young adults, in the kidney and bladder in those of advanced ages. In the former, acute attacks of colic occur; in the latter, mild symptoms, or those of the accompanying infection, are present. Fewer operations for acute appendicitis are being performed. More calculi are being assisted in their passage, or are being removed. Pro-lapsed kidney, with disturbed drainage and congestion, must be acknowledged to be a predisposing factor in kidney lesions. Urinary complications are common during the period of gestation. The frequent occurrence of cystocele in connection with frequency of urination in women past the meridian of life suggests that this condition, in women, with the residual urine subject to infection, may be the analogue of the enlarged prostate, with its urinary disturbances, in the male.

**Ureteral Catheter Drainage in Treatment of Renal Infections.**—J. R. Caulk (*Jour. A. M. A.*, 1917, lxviii, 675) strongly recommends drainage with the ureteral catheter in cases of infected hydro-nephrosis of pregnancy which do not yield to changes of position, flushing with water, administration of urinary antiseptics and bowel hygiene.

**Child Weighing Twenty-five Pounds at Birth.**—This most unusual case is reported by D. P. Belcher (*Jour. A. M. A.*, 1916, lxvii, 950). The mother, a multipara of thirty-five, 5 feet 7 inches high and weighing 220 pounds, measured 50 inches around the hips. Her eight previous children had weighed from 7 to 9 pounds. The position was L. O. A. When the os was dilated to four fingers three doses of pituitary extract were given and six and a half hours later the head was born. Great difficulty was experienced in delivering the shoulders and body. The child was stillborn. It weighed 25 pounds and measured 12 inches across the shoulders and 28 in length. The maternal perineum was slightly lacerated.



# DEPARTMENT OF PEDIATRICS.

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## TRANSACTIONS OF THE NEW YORK ACADEMY OF MEDICINE.

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### SECTION ON PEDIATRICS.

*Meeting of April 12, 1917.*

ROGER H. DENNETT, M. D., *in the Chair.*

#### SINUSITIS IN CHILDREN.

Sinusitis in children is barely mentioned or not mentioned at all in the standard works on Pediatrics, rhinology, or pathology, and even those books devoted exclusively to the nasal accessory sinuses give little space to sinusitis in children. One reason for this must be that the condition is often unrecognized by the pediatrician, rhinologist and pathologist. Authorities differ regarding the frequency of this condition in children, some stating that it occurs as often as in adults, while others maintain that it almost never occurs in children.

During the past four years at Johns Hopkins Hospital and Dispensary, 200 children presenting some definite sign or symptom of a sinus infection were most carefully examined, including the *x-ray*, and of these only twenty-three were definitely proven to have a purulent sinus infection.

The records of the Manhattan Eye, Ear and Throat Hospital for the past five years show but twelve cases of proved sinusitis in children. There are, however, records of undoubted sinusitis in children which are not included because the infection was not definitely proven, either at operation or postmortem.

It would, therefore, *seem* that sinusitis is not a common disease in children; it is nevertheless a most important one.

From a study of about 300 *x-ray* plates, together with the actual dissection of children's sinuses, it may be stated that the sinuses are probably more variable than any other structure in the body. Their size, shape, development, or even presence is never the same in two individuals, and even in the same person the sides are apt to be asymmetrical. The ethmoid and maxillary sinuses are present from birth and are clinically important from that time; the sphenoids and frontals are clinically important from the ages of three to six years. Some

of the thirty-five cases referred to above give interesting histories regarding the etiology. One followed going in bathing, four followed definite coryzas, six followed the infectious diseases measles(2), scarlet fever, typhoid, pneumonia and influenza (each one). Four came on suddenly over night, one followed a tonsillectomy and one followed extraction of a tooth. In a study of thirty-seven cases reported in the literature in which the etiology was mentioned in all but five it was scarlet fever. Grove reported a series of cases in which infection was due to postoperative vomiting following adenoidectomy. There were few reports of investigations having been made in a group of children with any infectious disease to determine the presence of sinusitis. It would be most instructive to study a group of children during some epidemic, especially of meningitis or poliomyelitis. Perhaps some valuable information regarding the portal of entry in these diseases could be obtained. Coöperation between pediatricians and rhinologists along this line should accomplish something.

Once a sinus is infected, anything causing obstruction to its drainage would determine the further course of the disease. In children, nasal obstruction is most often caused by adenoids and in certain cases of sinus infection not demanding radical operation an adenectomy will often give relief.

Sinusitis may occur at any age; the youngest case coming under our observation was five months old.

Acute sinusitis is said to be more frequent in children than the chronic form. Still, if children were systematically examined for a sinus infection, a chronic infection might be more often found.

Of our thirty-five cases, nineteen were acute, and nearly all presented some complications. Two had meningitis on admission to the hospital, three had orbital abscesses, two had orbital cellulitis with no pus found at operation or postmortem, five had swelling of the eyelids, one had an abscess of the lower lid, one swelling between the eyebrows, one a cheek abscess, and two suffered from acute otitis media, which cleared up on treatment of the sinusitis. Two gave evidence of profuse nasal discharge, and one complained of severe headache and nasal obstruction.

Often acute cases went undiagnosed or they might clear up spontaneously, death might occur and no autopsy be done, or the complication might be treated as an abscess of the eye, without ever knowing that a sinus infection caused it.

Chronic sinusitis was perhaps of more interest than the acute form. In adults it was an established fact that the sinus might act as a focus of infection, producing general symptoms and the same relation might hold good in children. Every child who suffers from meningitis, asthma, nephritis, arthritis, endocarditis, or headaches, in whom the etiology is obscure, as well as those suffering from long-standing coryzas, frequent tonsillitis, bronchitis or laryngitis, were carefully examined for a sinus infection the relation above mentioned might frequently be established. I have seen children with bronchitis, asthma and nephritis and acute otitis media markedly improved by operation on the infected sinus. In few chronic cases can the history

of an acute stage be obtained. Usually the onset is gradual and the symptoms indefinite. The diagnosis is only made after the most careful and painstaking examination and study. The most common symptoms complained of are nasal discharge, headaches and nasal obstruction. In treating sinusitis in children the same general principles apply as in adults. Nonoperative measures often produce good results. Twenty-one of the twenty-three cases were seen at least one year after treatment was completed, thirteen showed no evidence of active sinusitis; the remaining eight were all improved.

DR. COFFIN exhibited specimens showing the anatomical structures of the various sinuses in young children, and showed lantern slides illustrating the development of the sinuses at different ages, and the comparative appearance of normal and diseased sinuses as shown by the x-ray at the same time giving an informal talk on the diagnosis and treatment of sinusitis in children.

DR. DUNCAN MACPHERSON said: The paucity of the literature on this subject has been mentioned. Dr. Coffin has made a great part of the contribution to the literature of sinusitis in children and he is in a position to give us accurate information as to the anatomy and development of the sinuses in children.

In the matter of a diagnosis we have found there are many possibilities of making mistakes. The x-ray will probably give help but radiographs have been found deceptive. Dr. Coffin has shown us pictures in which there were marked contrasts and the evidence of health or disease very clear, but even in adults there are instances in which occasionally the x-ray is very misleading. In cases in which the x-ray has indicated the presence of disease we have found on operating a perfectly healthy sinus; on the other hand there have been cases in which there was evidence of sinus disease in which the x-ray gave no indication of its presence. So I would emphasize that depending on making the diagnosis from the x-ray alone is misleading. It is not the easy thing to tell whether the pus is coming from individual anterior or posterior cells that the pictures may have led you to believe. Frequently it is necessary to make two or three examinations and to employ suction before one is able to get pus and be positive that he is dealing with sinus disease.

The diagnosis of sinus disease is of considerable importance in view of the fact that so much has been said with reference to focal infection and no doubt an infected sinus may furnish a focus of infection. In children the symptoms are entirely objective and therefore it is very much more difficult to tell whether disease is present. Even adults may be swallowing secretions from a diseased sinus without noticing it until they have been put in a healthy condition and then they admit that they have been swallowing it. Children are, of course, unable to give any information of value and one has to draw his conclusions entirely from observation. Frequently the examination of a child's nose is very difficult. One cannot tell much from the nasopharynx as there may be small adenoids present and it may not appear abnormal if there is a small amount of secretion present. If on looking under the inferior or middle

turbinate one finds after two or three examinations a layer of mucopus it may be an indication of a possible sinus condition. A few years ago we were accustomed in such cases to clip a little piece off the inferior border of the inferior turbinate or else use applied astringents. Now these patients are treated by suction, not a large heavy suction but a mild suction by means of a catheter combined with light general suction thus removing the secretion from the mucous membrane and nasal cavities. This applies to cases of acute rhinitis and coryza where on careful examination we find pus. The mother or nurse should give careful attention to the amount of mucus that is secreted by a child under the age of three to five years as such observation is of considerable value. In adults the question we ask is "How often do you blow your nose or how many handkerchiefs do you use in a day?" Anybody using more than one handkerchief a day is considered as having an abnormal amount of secretion and probably there is something wrong with some of the sinuses.

Another point that is important is the relationship of sinus disease to otitis media. We have found a certain number of cases of recurring otitis media which have cleared up on treatment of a sinus infection. Where one finds repeated acute exacerbations of middle ear trouble it is well to remember that they may be the result of a "dirty" nose, and frequently there is behind it a sinus condition. This renders the child susceptible to acute rhinitis and middle ear disease, and predisposes to exacerbations. Dr. Coffin has pointed out that by careful observation it is possible to tell from which cells the discharge is coming, though this is not as easy as it might appear from his statements. It may be repeated that the ethmoids are present from birth and a child may have ethmoid disease at birth. The frontal sinuses only make their appearance at about the first to the third year. The maxillary sinuses are present at birth as a small slip. They look smaller because the mucous membrane is relatively thicker.

One point with reference to washing out the antrum. The method described has been to go in as high as possible under the inferior turbinate and to direct the needle upward. In the child or adult this is dangerous because of the possibility of going through into the orbit. The way to avoid this is to turn the needle downward reversing the direction, but introducing the needle as high under the inferior turbinate as it can be placed.

In cases of orbital abscess, so called, it may not be possible to find pus in the orbit. In many instances one is not dealing with an orbital abscess but with a cellulitis. The pus is in the sinus and we can get it out by treating the sinus without making an incision through the eye-lid, because the trouble has its origin in the sinus.

DR. SEYMOUR OPPENHEIMER said: I have been interested in Dr. Coffin's presentation because I have made some investigations along these lines. I think if one makes a series of sections of skulls of children, he will be struck by the fact that the sinuses develop earlier than he has considered to be the case. There is no question as to the frequency of these conditions in children. In a series of

cases of suppurative middle ear disease upon which I have reported, there were a number showing the presence of suppurative processes in the sinus. This is not surprising as the mucous membrane lining the Eustachian tubes is a continuation of that lining the nose and throat. In influenza, measles, and scarlet fever we should expect infection from the nose to extend into the lining of the sinuses. After a careful study of the surgical anatomy of the parts, one is not surprised to find orbital complications in the presence of sinus disease. I have also seen two cases of basal meningitis from infection of the sphenoid cavity. If one studies the relationship of the sphenoid to the base of the skull it is easy to see why this may occur.

Another cause of sinusitis in children not mentioned in the paper is the vaginal discharge of the mother at the time of the birth of the child.

As to the relationship of sinus disease in the adult to preëxisting disease of a similar nature in the child there can be no doubt. If one goes back through the history of these patients, one finds evidence of sinus disease extending back into early childhood. Purulent rhinitis is undoubtedly due to infection of the accessory nasal sinuses.

One thing has struck me as very significant and that is in reference to the lymphoid tissue. One is likely to find this increased in amount on one side when there is accessory sinus disease. A unilateral hypertrophy along the faucial fold is suggestive of underlying sinusitis.

In closing I would like to suggest that a little more attention be given to children with "snuffles" and a mucopurulent discharge during the diseases of childhood; a large proportion of these cases clear up without surgical interference, but there may be a latent process that will give rise to disturbance in later years.

DR. L. T. LEWALD said: Dr. Coffin has brought out the point as to the frequency of maxillary sinus disease in children and Dr. Oppenheimer has emphasized this fact. From many postmortems on children I have been struck by the frequency of sinus complications. I wish to emphasize the frequency of these conditions found in making x-ray examinations. The difficulty of getting evidence of the presence of ethmoid disease by means of the x-ray has been spoken of; the Caldwell position gives a better angle for the ethmoid and frontal sinuses than the so-called Baltimore position.

In addition I wish to lay stress on the stereoscopic examination.

#### GOITER IN CHILDREN. WITH REPORT OF TWO CASES OF CONGENITAL GOITER.

DR. PETERSON.—Goiter in childhood is of frequent occurrence in goiter districts abroad and is by no means uncommon in certain districts in this country. Scattered throughout the literature are numerous reports of both the sporadic and the endemic types. It manifests in a general way the same clinical and pathological varie-

ties as seen in the adult, and the same imperfectly understood causative factors are believed to be concerned in its production.

Goiter may occur congenitally; it occurs more often in the male than in the female. Demme in Switzerland collected 642 cases of which fifty-three were congenital. Goiter of the new-born is often nothing more than a tumefaction of the thyroid gland which disappears spontaneously in a few weeks. Less often there is a persistent tumorous enlargement which gradually increases in size. Ninety per cent. of the cases of congenital goiter, if the goiter persists, show evidence of hypothyreosis or develop cretinism.

Claude White (*Journal of Obstetrics and Gynecology of the British Empire*) has reported the case of "Fetus with Congenital Hereditary Exophthalmic Goiter." It is the only example of the kind that I have been able to find in the literature. I have had two cases which I wish briefly to report.

The first patient came under my observation on January 18, 1905 when she was five weeks old. At that time she was admitted to the Babies' ward of the Post-Graduate Hospital. Her parents were Hungarians. The family history was negative. Labor was easy and the infant was normal at the time of birth, except for a relatively large tumor on the right side of the neck. There was some difficulty in breathing for the first two hours after birth, after which there was neither dysphagia nor dyspnea. The growth lay on the right side of the neck behind and to the inner side of the sternomastoid muscle, extending from the level of the jaw downward nearly to the clavicle. The tumor was made up of two masses the larger situated above. It was smooth on the surface, of firm consistency and did not fluctuate at any point. Below and to the side there was distinct palpable nodulation. An incision was made parallel to the right sternocleidomastoid muscle. A fibrous capsule which surrounded the growth was opened and the tumor was dissected out without difficulty. Several times during the operation artificial respiration had to be resorted to. The wound was closed without drainage. For twenty-four hours after the operation the infant had to be prodded occasionally as breathing would stop. At such times artificial respiration was employed. The temperature rose to 105° F. shortly after the operation and then gradually declined. On the ninth day after the operation a convulsion occurred. After this convulsions became more frequent and severe. When the pathologist's report was received stating that the specimen was a "congenital thyroid tumor," it was believed that the entire thyroid gland had been removed and thyroid extract was started at once. This was followed by a cessation of the tetany. At this time palpation of the neck showed no evidence of any remaining thyroid. The thyroid feeding was kept up for the first four years of the patient's life and then discontinued. A close watch has been kept for any evidence of hypothyroidism, but the patient's subsequent development has been normal both mentally and physically.

**Pathological Report.**—Dr. Sondern made the following report: Macroscopically the tumor is horseshoe in shape, one side being

composed of a large elongated tumor mass measuring  $6 \times 4 \times 3$  cm. The other side was composed of a tumor measuring  $4 \times 2\frac{1}{2} \times 3$  cm. These two tumors were joined at the concavity of the horseshoe by a band of fibrous tissue. Both of the tumor masses had a slight irregular lobulated appearance. Microscopically sections taken from both tumors showed the same structure, which was that of the thyroid gland. The acini had undergone a slight adenomatous proliferation. The diagnosis was adenoma and colloid degeneration of the thyroid gland. The questions which this case brought up were: Was all the thyroid tissue removed at the operation? Why did tetany develop? Would the child continue to develop normally?

The second case was that of a boy of ten years who was operated on July 6, 1916. The operation presented no peculiar difficulties. The patient had been greatly improved by the operation. The mass removed weighed 65 grams, according to the report of the pathologist. It gave the typical picture of thyroid adenoma. The pathologist believed it impossible to say whether the growth was or was not malignant at the time of its removal, but stated that it certainly presented characters suggestive of such tendency and in all probability if not completely removed would recur locally.

The following points are of interest in connection with goiter in childhood. Colloid goiters are exceedingly rare in childhood. A localized swelling or encapsulated adenomatous growth of the lower pole of the right lobe are the types most frequently encountered. The right lobe is involved ten times as often as the left. Juvenile goiter affects males almost as often as females. Grave's or Basedow's disease is rare in childhood. We, however, have encountered two typical cases, a girl of nine years and another of twelve. Seibert believes that the trouble yields more readily to treatment in children than in adults.

Inflammatory swelling of the thyroid is the course of acute infectious diseases, but suppurative thyroiditis is almost unheard of in pediatric practice. However, within a period of six months we have had two cases of thyroid abscess in our Babies' Ward Service. It is exceptional to find a child with a goiter who is perfectly normal mentally and physically. Influences which tend to increase the thyroid circulation, such as prolonged physical and mental strain, depressing emotional excitement, puberty, pregnancy, etc., favor the further growth of the goiter once it is started.

The treatment of simple goiter is (1) palliative and (2) operative. Palliative treatment includes systematic rest, drugs, laxatives, intestinal antiseptics, specific thyroid medication, and x-ray and radium therapy. Early cases of diffuse goiter are amenable to appropriate medical treatment.

The indications for operation are as follows: 1. All simple goiters which do not respond to medical treatment. 2. Nodular goiters. 3. Goiters producing pressure symptoms. 4. Abnormally situated goiters, especially those which project into the thorax. 5. Goiters developing suddenly and growing rapidly. 6. Painful or sensitive

goiters. Operation is contraindicated when serious cardiac, pulmonary or renal disease exists. The most useful and the most frequently applicable operation is the method of excision as practised by Kocher. Enucleation can be recommended in selected cases for the removal of single encapsulated growths or cysts. Resection is indicated in large diffuse goiters, when for curative as well as cosmetic reasons, the removal of one lobe was not sufficient. In nodular goiter involving both lobes of the gland, excision of one lobe with enucleation of the growth in the other lobe, was the method generally employed. Exenteration is practised in inflamed or deeply seated or inaccessible growths, where complete removal is unwise or impossible. Ligation of the thyroid arteries alone is rarely ever done in cases of simple goiter as the more radical operation can usually be carried out. Under no circumstances should the whole thyroid gland be removed. Every effort should be made to preserve the parathyroids. The removal of too much or of all of the gland will be followed by myxedema, and if the parathyroids are removed at the same time tetany and death will ensue.

DR. NELSON W. JANNEY read a paper entitled

#### AN EXPERIMENTAL AND CLINICAL STUDY OF THE ISOLATED THYROID HORMONE.

He reported an investigation of the hormone isolated by Dr. E. C. Kendall of the Mayo Clinic. This preparation presents unusual difficulties in its isolation and purification. In the pure state it is crystalline, has a constant melting point and consists of 66 per cent. iodine. The therapeutic effect of the hormone was controlled by metabolic studies made on animals and thyroid patients.

These studies have been now extended to a series of normal control cases, exophthalmic goiter and cretin patients. Normal individuals react with tachycardia and other toxic symptoms with very small amounts of the thyroid hormone, usually 1 to 2 milligrams daily being sufficient to cause this reaction if continued for some time. The nitrogen balance begins to decrease before the clinical symptoms appear. Metabolism is evidently profoundly effected by the hormone. Small doses varying from 0.01 to 0.1 milligram daily were administered to various exophthalmic goiter patients. In some cases improvement of the clinical symptoms and increased retention of nitrogen were observed. In the majority, however, the clinical condition and nitrogen balance remained stationary so that, as would on *a priori* grounds be expected, no definite therapeutic effect in exophthalmic goiter was observed.

Prolonged studies were carried out on a cretin who remained on fixed weighed diets and daily determination of the nitrogen intake and output, for a period of some thirty weeks. It was found that decided clinical improvement followed daily administration of a hormone solution containing 0.25 milligram iodine. Marked retention of nitrogen occurred on this dose and went hand in hand with



the clinical improvement. The great activity of this preparation may be judged from the fact that 0.5 milligram daily was found by our metabolic methods of investigation to represent an overdose. That the nitrogen retention was due to the effect of the thyroid preparation was proven by administering fresh thyroid gland and thyroid tablets to the same patient, both of which caused nitrogen retention likewise.

From this work the conclusion may be drawn that the thyroid hormone as isolated by Dr. Kendall probably possesses all the therapeutic action hitherto ascribed to thyroid preparations. It is likely that owing to its fixed constitution and the delicacy thus to be obtained in the dosage, that this hormone will be preferred to other thyroid preparations when its production attains commercial proportions.

#### A CASE OF EXOPHTHALMIC GOITER.

DR. SARA WEIT-KAKELS.—This patient is a boy, fourteen years of age. I will omit his history except to mention that he gives a history of emotional shock.

Exophthalmic goiter is a condition which is rare in boys and it is rare in children under fourteen years of age. It is stated that only 5 per cent. of the cases under sixteen years of age present the characteristic symptoms of tachycardia, exophthalmos, etc. This patient shows these characteristic symptoms including Graefe's symptom, that is, the upper lid does not follow promptly and evenly the movement of the finger downward, but halts and moves jerkily. Furthermore, he shows a defect in convergence. The tonsils are irregular and enlarged. He has a tremor of the fingers, tachycardia, 92 to 120. The action of the heart is normal, though there is a change in the sound over the right apex and also over the thymus. There is nothing of significance in the urine. The blood pressure is 135 to 140. It is claimed that high blood pressure is found not only in hyperthyroidism but also in hypersecretion of the adrenals and that cases of adrenal involvement usually show the higher blood pressure. The Wassermann was negative. Blood examination showed hemoglobin 58 per cent. red blood cells 3,300,000, leukocytes 14,000.

This is not the characteristic blood picture in exophthalmic goiter; one would expect to find a lymphocytosis.

To review this subject in brief, one must begin with the pathology which, of course, is quite different in simple goiter from that of exophthalmic goiter. It is also important to recognize the distinction between localized and diffuse goiter, especially in children. The diffuse symmetrical enlargement of the thyroid seems to represent a hypertrophy which is compensatory to some unusual demands upon the gland, or to ordinary demands upon a gland which has not the normal strength. This kind of a goiter needs no operation, but does need supporting treatment in the form of good hygiene and generally one or another kind of thyroid feeding, which is supposed to help out a feeble organ.

The localized cysts, or adenomata, of the thyroid, seem to repre-

sent a disease which may or may not arise from some obstruction to the outlet of the thyroid secretion. At any rate, the localized tumors apparently press upon the rest of the gland and interfere with its function, and predispose it to further degenerative changes and, therefore, should be excised. This is true when the constitutional condition represents either a hypo- or a hyperthyroid activity.

Exophthalmic goiter, as proved by the case shown here to-night, is not very uncommon in children, and in my experience is an exceedingly serious disturbance. It always requires surgical interference. If the enlargement and disease of the thyroid is confined to a single portion of the gland, this portion should be excised and the superior, and generally the inferior, thyroid vessels ligated. When the gland is symmetrically diseased, especially in these youthful cases, my experience with excision has been disastrous. I advise in all cases of exophthalmic goiter, when the gland is diffusely involved, that all four thyroid vessels be tied in two or more sittings, and one or another kind of organ therapy, generally an adrenal extract, but subsequently instituted. I should pursue this course in the case presented here this evening.

I have recently observed some experiments in animals which seem to confirm the theory that the thyroid gland has much to do with the production of energy. It is possible to isolate and attach to a writing lever one of the voluntary muscles of a cat. This muscle, when stimulated with electricity, will continue to contract without much evidence of fatigue for four or five hours. If the thyroid gland, however, is previously extirpated, fatigue of the muscle under the same stimulation will take place within fifteen or twenty minutes. An injection of thyroid extract, which we make at the Loomis Laboratory, will then cause the muscle to contract vigorously and without fatigue for several hours. Hence, it seems probable that the thyroid has a great deal to do with the production of muscular energy, and there is good reason for enforcing the rest which is so necessary in the treatment of these cases.

As to the so-called active principle of the thyroid, with which Dr. Janney has been experimenting, one should be a little cautious in accepting the results of its clinical exhibition. Almost any material isolated from the thyroid gland is capable of producing more or less marked clinical results. If the active principle is ever found, it must be determined with far greater accuracy than is possible by clinical observations.

In conclusion, I suggest that children are far more frequently the subjects of hypo- or hyperdisturbance than is generally realized, and especially are they the subject of hypothyroidism. In cases of hyperthyroidism in children I urge conservative rather than radical interference, as it is possible by damage of the thyroid to bring about rather serious consequences.

DR. WALTER TIMME said: I agree largely with the statement made by Dr. Rogers; first as to nonoperative procedures in children. Most of these cases have their origin in emotional shock or heredity. These overturn the balance of the internal secretions, but it is fre-

quently resorted spontaneously at puberty or after the establishment of menstruation. We get many other cases without exophthalmos due to depressions at these critical times in the child's life, and if surgical interference can be held in abeyance until the child passes through them it should be done.

Dr. Peterson mentioned one case in which after operation thyroid feeding stopped tetany. In cases in which tetany is produced by excision of the thyroid it is due to the fact that the parathyroids have been impaired in their activity. If the thyroids alone are excised we do not get this effect. Cases treated by the x-ray in which the thyroid disappears sometimes show tetany and spasmophilia because the interference with the thyroid has caused in the parathyroids also decreased activity. These cases showing tetany should be treated with calcium salts, and parathyroid secretion.

Dr. Peterson has spoken of the importance of iodine in the management of these cases. If the iodine content is increased it increases the capacity of the thyroid as a reservoir and hence causes a diminution of thyroid in the body.

So far as Dr. Kendall's experiments are concerned it is interesting to note the accidental character of his discovery. He had already obtained some of the crystals, but for a year after the first success, he could get no more. He used a form of thyroid gland during this time without result. Finally he remembered that in his original work the result was obtained while working next to a freezing microtome with an atmosphere charged with carbon dioxide. Upon repeating the process in the presence of carbon dioxide, he again succeeded in getting his crystals.

However, Dr. Kendall is not a clinician but a chemist. What he says with reference to chemistry can be accepted without criticism, but this is not true of his clinical observations and conclusions.

The substance which he has isolated is a hormone which has toxic properties, the "A" portion of which is insoluble in acid; and this hormone produces in cretins and in animals used as controls certain effects; and yet that portion "B" which is soluble in acid does not seem to contain these toxic properties; nevertheless, it does have an effect for betterment when administered to cretins. This would seem to bear out the theory that there is at least one other hormone that is not contained in the "A" crystals, the rest of the thyroid containing others.

Another point I would speak of is that if this thyroid preparation is given to patient having myxedema the nitrogen balance is disturbed and yet in no case cited by Dr. Janney has an account been given of the nitrogen thrown off in the perspiration. It is well known that in myxedema patients the skin is very dry and when they are treated with thyroid the skin loses this dryness and becomes moist; this loss must be taken into account. This nitrogen that does not come out in the urine or feces must be accounted for as it is not necessarily used by the cretin in growth.

The relationship between the thyroid, thymus, pituitary and adrenals is such that no statement can be made regarding the increased

blood pressure as due to one or the other of these ductless glands. If there is a large amount of adrenalin and a small amount of thyroid there may be an increased blood pressure when the thyroid is administered, or we may have an insufficiency of adrenalin, in which case the thyroid acts to lower the blood pressure. Thyroid disturbance can never be integrated in terms of thyroid alone but one must always take into consideration the effect of every other gland of internal secretion. Dr. Janney's presentation is very interesting and Dr. Kendall's discovery one of the greatest advances made in this country in organotherapy.

DR. JANNEY, in closing the discussion said: There is one omission to which I wish to call attention. An adequate explanation for the cause of the toxic symptoms observed in exophthalmic goiter has never been advanced by writers on this disease. The following chemical hypothesis has long seemed reasonable to me and I venture to suggest it. It is well known that very slight changes in the constitution of various complex substances occurring in the organism may lead to a normal body constituent becoming, under abnormal conditions, a deadly poison. Thus the amino-acid histidine, which occurs in body protein, through the simple replacement of its acid group  $-\text{COOH}$  by an amino-group  $-\text{NH}_2$  becomes  $\beta$ -imidazolethylamin. The latter compound is highly toxic. In applying this consideration to the thyroid, we may observe that Kendall considers his hormone to be a di-iodo-oxyindol which *also contains the acid*  $-\text{COOH}$  group. It seems, therefore, not improbable that through a metabolic defect, the proper synthesis of the hormone in Grave's disease, might be disturbed with the replacement just as in the example quoted above, of the  $-\text{COOH}$  group by an  $-\text{NH}_2$  group. This would probably lead to the production of a toxic substance, which may be responsible for the production of the toxic symptoms.

The point has been brought up by Dr. Timme as to whether the elimination of nitrogen in the preparation might have influenced the nitrogen balances obtained in our investigation. It is, however, known that but very little nitrogen escapes through the sweat. It is also to be remembered that the nitrogen balances in our patients usually increased during the thyroid periods. If the administration of thyroid causes, as might be supposed, an appreciable increase in the loss of nitrogen through the skin by stimulating perspiration, the effect on the balance should be a *decrease* not an *increase* as was observed by us.

With regard to the question of the rationale of trying the hormone in hyperthyroidism, I may say that the many fruitless attempts to treat this condition with thyroid preparations were, of course, known to us. We felt, however, as we had finally the real active principle of the gland in our hands a control of such former therapeutic studies was indicated in this case.

A last point, not especially alluded to in the paper or discussion is the excellent means we now have of ascertaining the underlying condition of thyroid patients by use of the clinical calorimeter. This instrument is now gradually being installed in the largest hospitals.

## BRIEF OF CURRENT LITERATURE

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### DISEASES OF CHILDREN

**Bacteriology of the Urine in Children.**—In 118 specimens of carefully catheterized urine from sixty-one different girls, examined by C. Beeler and H. F. Helmholz (*Amer. Jour. Dis. Child.*, 1916, xii, 345) sixty-one were sterile and fifty-seven contained bacteria. Of those from normal infants, thirteen were sterile and eleven contained bacteria. Of those from extraordinary infections in patients under two years of age, none were sterile and twenty-four contained organisms. In those from girls over two years, thirty-eight were sterile and twenty-two contained bacteria. The number of bacteria found in Series 1 was considerably larger than in Series 2. This may be explained by the fact that in the older children one can cleanse the urethral orifice much more easily than in the infant and introduce the catheter directly into the urethra. The bacterial flora was practically the same in both series, gram-positive cocci and diphtheroid organism predominating, the former being present in practically every case in which any organisms were found. In no instance were gram-negative bacilli found in such numbers in both specimens that it seemed probable that it was more than an accidental contamination from the urethra. The writers conclude that organisms of the colon bacillus group are not normal inhabitants of the female urethra. In extraordinary infections occurring in the first two years of life the colon group of bacilli are frequently found in the urethra (one-third of the cases). In girls over two years of age the urine is almost free of organisms, and in their series was entirely free from bacilli of the colon group (eighteen normal, twelve other infections).

**The Rat and Infantile Paralysis.**—After reviewing the facts which are approved to transfer of infantile paralysis by direct or indirect human contact, M. W. Richardson (*Bost. Med. and Surg. Jour.*, 1916, clxxv, 397) argues that the theory that the disease is transferred by rodents, insects, or both is supported by the summer incidence of the disease. The rat has a world-wide distribution and is found in habitations of all classes of the community, rich as well as poor. In the winter time the rat keeps largely to its hole, coming forth in the spring with the advent of warm weather and the growth of appropriate food. It seems highly probable that rats are more common in the country, at least in proportion to the population, than they are in the city. Children are constantly in the barns and numerous cats and dogs might convey infected fleas to the houses. The great increase in poliomyelitis during the last twenty-five years

has been explained as due to the great increase in facility of transportation all over the world, so that infinitely increased human contact has become possible. The same argument would apply, however, to the transfer of infected rats from one locality to another. Children living near railroads might play in rat-infected freight cars. Infected rats, if dropped from freight cars, would seek their food in the immediate neighborhood. Infantile paralysis (*a*) occurs in foci, (*b*) in general, the cases spread more or less radially from centers of infection, and (*c*) the intensity of infection rises in one neighborhood while it is decreasing in a focus in its immediate vicinity. Such a fact is perfectly consonant with a gradually spreading infection of rodents. The migratory habits of the rat are well known. Before the beginning of an epidemic, a single case of infantile paralysis may occur in the early months of the year, several months before the real epidemic. The period between generations of rats is approximately three months; a new generation of young rats may possibly be necessary to the further propagation of the disease. Or, perhaps, the virus must undergo a cycle of development in the flea. Districts severely affected by infantile paralysis are rarely affected again for a considerable period of time. Such a local geographical immunization might well be possible through extensive infection affecting primarily not the human but the rodent population. With the immunization of the rats, the human epidemic must necessarily cease. In the transfer of the infection from the rat to man, the agency of the flea is assumed, although the possible contamination of food by rodent excretions might well be considered. The insect transfer might be simply mechanical or it might require a preliminary cycle of development of the virus in the flea. The possible rôle of cats, dogs, and other animals, or even human beings, as carriers of infected fleas, would be apparent. In grossly unsanitary surroundings, the fleas might carry infection from one child to another directly.

**Immune Human Serum in the Treatment of Acute Poliomyelitis.**—C. W. Wells (*Jour. A. M. A.*, 1916, lxvii, 1211) says that the administration of immune serum in acute poliomyelitis is based on recognized principles of immunity. Because the lesions are not confined to the nervous system, and because the lesions therein consist essentially of perivascular infiltration, intravenous injection of serum appears to be a rational procedure, either alone or in combination with intraspinal injection. Intravenous injections of serum should if possible consist of doses of from 50 to 100 c.c. or more daily. Following intravenous or intramuscular injections of serum, spinal fluid should be withdrawn. Intraspinal injection of serum usually produces an increase in the number of the leukocytes with increase in the proportion of polymorphonuclear cells in the spinal fluid. No ill effects have followed the use of serum in the writers' series of fifteen cases, either by intravenous or intraspinal injection. In all cases after intravenous injection, and to a less degree after intraspinal injection, a noticeable improvement usually occurred, which, unfortunately, however, in some cases was only transient. Early

administration of the serum is urged, necessitating therefore an early diagnosis of the disease; in severe cases late administration of the serum has produced little if any noticeable influence on the course.

**Etiology of Epidemic Poliomyelitis.**—E. C. Rosenow, E. B. Torone and G. W. Wheeler (*Jour. A. M. A.*, 1916, lxvii, 1202) have isolated a peculiar streptococcus from throats, tonsils, abscesses in tonsils and from the central nervous system in cases of poliomyelitis. Paralysis was produced in animals of various species by intravenous and intracerebral injection of cultures of this organism, and lesions of the gray matter of their nervous system were demonstrated. From the nervous system of these animals the streptococcus was isolated in pure culture, while their other tissues were sterile; it is remarkably polymorphous, and appears to grow large or small according to the medium in which it is grown, even after passage through a Berkefeld filter. Using the organism in its large form, paralysis was consistently produced in animals known to be insusceptible to inoculation with material from epidemic poliomyelitis as heretofore practised. After paralysis had been produced in a series of three rabbits, the strain caused characteristic paralysis and lesions of poliomyelitis in monkeys. It appears that the small, filterable organism which has been generally accepted as the cause of poliomyelitis may be the form which this streptococcus tends to take under anaerobic conditions in the central nervous system and in suitable culture mediums, while the larger and more typically streptococcic forms, which investigators have considered contaminations, may be the identical organism grown larger under suitable conditions.

J. W. Nuzum and M. Herzog (*Jour. A. M. A.*, 1916, lxvii, 1205) have obtained from the postmortem material in typical cases of poliomyelitis, from tissues of the central nervous system, tonsils and mesenteric glands, and from the cerebrospinal fluid obtained by lumbar puncture during life, a gram-positive micrococcus which grows well on dextrose ascites broth to which a sterile piece of rabbit's kidney has been added—but always better aerobically than anaerobically. Cultures of this organism, when injected into monkeys, produced the typical clinical and pathologic picture of acute poliomyelitis. Definite flaccid paralysis produced in dogs and in many young rabbits. In rabbits, however, as others have pointed out, there is a variation in the microscopic picture, although many of the changes attendant on the disease in man and monkeys are present in the central nervous system of the rabbit following paralysis. Anaerobic cultures in fluid mediums were passed through Berkefeld filters V, and inoculations of the filtrate into suitable mediums produced a growth of the larger form of the organism seen in aerobic cultures. This would seem to indicate that the organism under anaerobic conditions assumes a form so small that it may pass through the Berkefeld filter. The virus of rabies, as is well known, presents itself in a large form, the Negri bodies, and in the small punctiform granules which can evidently pass the filter. In considering the

gram-positive coccus in its etiologic relation to acute poliomyelitis, we must remember that it may act as a carrier of a real ultramicroscopic invisible virus which, together with this micrococcus, might still be transferred in the cultures and passed along in the inoculations. In tissues from the central nervous system of poliomyelitic material preserved in 50 per cent. sterile glycerin, this same micrococcus was alive after a period of thirty-five days, and could be cultivated in pure culture on suitable mediums.

J. W. Nuzum (*Jour. A. M. A.*, 1916, lxvii, 1437) reports the isolation of this coccus from the cerebrospinal fluid of forty-five out of fifty cases of acute poliomyelitis. It presents both the cultural and morphologic characteristics of the micrococcus isolated from the brain and spinal cord of fatal human cases. When injected into monkeys, young lambs and rabbits flaccid paralysis of the extremities followed, with typical histologic changes in the central nervous system in many cases and recovery of the organism from cerebrospinal fluid and central nervous system at autopsy of the paralyzed animals. The organism was also stained in sections of the cord and medulla.

Working with this organism, which was isolated by several independent observers at about the same time, J. W. Nuzum (*Jour. A. M. A.*, 1917, lxviii, 24) by animal immunization produced an antiserum which was apparently efficient in animals. Antiserum prepared in this manner contains agglutinins, opsonins and complement-fixation bodies, as well as exhibiting certain antibactericidal properties. Its therapeutic action in man has not been determined.

After recording his observations regarding the cultivation of the organism of poliomyelitis upon solid media, H. Greeley (*Med. Rec.*, Jan. 13, 1917) says that the remarkable way in which the spread of the malady is affected by the atmospheric temperature; experiments in reference to the growth of the organism at temperatures known to prevail when the disease is at its height, and its ready growth in milk and resistance to the pasteurization process, together with the case incidence among the children of milk drinking age, all strongly indicate that milk may be a very important factor in the spread of poliomyelitis. Apart from any possibility in connection with milk, it is not to be doubted that the malady may be transmitted by personal contact, and this would, of course, extend to the babies of mothers who might become infected by the poliomyelitis organism (for instance causing a transient pharyngitis in the mother).

**Treatment of Rickets.**—E. Pritchard (*Brit. Jour. Child. Dis.*, 1916, xiii, 295) says that the physiological food demands of many infants and children are negligible. If they are kept in hot, stuffy rooms, if they are wrapped up in a multiplicity of clothes, if they are seldom taken out of doors, and if they are given no opportunities for muscular exercise, they will create no demand for food, and consequently any dietary, however small, may be *relatively excessive*, and, if excessive, must be disposed of by storing up the excess in the form of a food reserve, for instance, as glycogen or fat; by oxidation to the normal end-products, carbonic acid gas, urea, and water; or



by the production of incompletely burnt up products of combustion, flooding the blood with acid bodies of large molecular size. These are the usual conditions which surround the victims of rickets. Under such circumstances we could predict with complete confidence that the child would, if he could, lay up stores of glycogen and fat and become obese; that he would show evidence first of excessive combustion by sweating and vascular dilatation of the superficial capillaries of the face and other exposed parts, and possibly by disturbances of the heat regulating centers, and then of suboxidation with the symptoms of an acidosis, with enlarged epiphyses and demineralization of bone; and finally of acyanotic hypernea with other serious nervous manifestations. The writer has, for many years, treated all cases of rickets on the assumption that this is the true pathogenesis of the disease. An illustrative case is reported.

**Eosinophilia Occurring in Infants Following Ingestion of a Foreign Protein.**—Recent work has shown that several common diseases, accompanied by an increase in the eosinophilic cell count in the blood, are due to an allergy to one or more proteins, to which the individual is sensitive. Differential blood counts were made by H. C. Berger (*Arch. Pediatrics*, 1916, xxxiii, 742) on infants after the administration of foreign protein in the food. Infants who had previously been entirely on the breast were given daily feedings of a simple modification of cow's milk. Some infants, having previously had a cow's milk modification, were given a sheep's milk modification, or some other food, containing a protein foreign to that particular baby. When a protein was introduced into an infant's diet, which that infant had never previously ingested (*i.e.*, a foreign protein), there was usually an increase in the percentage of eosinophile cells in the general circulation. As a general rule, this appeared in from nine to twelve days after the ingestion of the foreign protein, and very soon the percentage of eosinophile cells returned to normal, or near normal. If we may assume from the work of authors quoted that an increase of the percentage of eosinophile cells in the blood is evidence of sensitization to a protein, the work of this paper is significant.

**The Neurotic Child.**—According to C. M. Campbell (*Amer. Jour. Dis. Child.*, 1916, xii, 425) the study of the psychoneuroses of the adult has thrown a good deal of light on the complexity of the life of the child; conflicts analogous to those of the adult are present in childhood, and may give rise to the same types of nervous disorder. The neurotic child may show at an early age difficulty in passing from one stage of adaptation to another, a tendency to retain the attitude of the earlier stage, an incomplete assimilation of the more mature attitude. Familiar symptoms may indicate the presence of such a difficulty in the child's adaptation and the recognition and treatment of the difficulty will depend on a just appreciation of the complexity of the child's life, a complexity which is alien to the conventional conceptions of childhood. In the study of the rôle played by certain symptoms in childhood it is useful to remember that these symptoms may be a method by which the child, more or less subconsciously, asserts himself and enjoys certain immunities or privi-

leges. Although certain symptoms may arise in a very complex manner and persist owing to their utility, they need not have such complex significance; they may, as the indicators of a constitutional nervous instability, be elicited by a great variety of causes. The pediatricist, by the application of accurate methods to the study of these early symptoms, may contribute to psychopathology a much clearer formulation of the basis of some types of nervous constitution.

**Fruit Juice for Atrophic Infants.**—H. B. Gladstone (*Practitioner*, 1916, xcvi, 472) says that fruit juice can be taken to the extent of a pint daily, with immediate benefit to a dyspeptic atrophic infant under one or two years of age. A carefully selected predigested food, low in albumin and fat and high in sugar, will then be both digested and absorbed and result in gain of weight. At first a loss of weight must be expected, but, by the end of the first week, this is usually regained. Unless the juice is followed by a diet scientifically adapted to a weak digestion, it does no permanent good whatever. The juice, no doubt, acts partly on account of its acid reaction, rendering the bowel unsuitable for germs growing in an alkaline medium. It has a tonic, cleansing effect upon the mucous membrane of the digestive tract, and is a diuretic, diaphoretic, and general alterative. It supplies an attractive drink, enjoyed by all babies, containing 10 per cent. of soluble carbohydrate food, removes the irritability and restlessness of the child, promotes quiet sleep, and renders the digestive organs able to digest and absorb a light diet. While oranges were available, the juice was made of two parts of orange juice to one of apple juice, diluted with one-quarter the quantity of water. Melon and apple juice has been used with somewhat less good results. Strawberry, cherry, raspberry and banana juices have been taken and enjoyed by the babies and did not produce any bad effects, and it is probable that any fruit juice available would succeed, provided the acid fruits were not used in too large a proportion, and that when oranges are out of season it will be found advisable to add a small quantity of lemon juice to the sweeter fruit juices, to supply the necessary acidity.

**Progressive Torsion Spasm of Childhood.**—J. R. Hunt (*Jour. A. M. A.*, 1916, lxxvii, 1430) reports a case of motor disturbance known as progressive torsion spasm or dystonia musculorum deformans occurring in a girl of twelve years. The first symptoms appeared at the age of six. It is a progressive organic affection of the central nervous system. There is gradual loss of a mechanism which is engaged in regulating and controlling tonus during the voluntary, automatic and reflex activities of muscles. As a result, there is a disturbance or loss of those reciprocal tonus activities of agonistic and antagonistic muscles which are a part of every complex or synergic movement. This and the loss of inhibition are the chief factors in the production of the motor disorder. It runs a progressive course and then remains stationary, other portions of the nervous system remaining unaffected. It is closely related to athetosis and yet in its typical form is readily differentiated from this affection. Transition or combined forms probably occur. It

is essentially a disease of childhood, but has appeared as late as the seventeenth year. The face and muscles of articulation are not affected except in the terminal stage, when there is involvement of the muscles of the neck. Such mild disturbances as have then been noted are probably of secondary origin. With the characteristic torsion spasm there is usually but not always associated a not inconsiderable degree of hypotonia. There may be a hemilatera involvement of the extremities which may exist as such for some years. A pseudoparaplegic or paraplegic type may also occur. The torsion movements continue, but are diminished during rest, and are greatly increased by any muscular activity, especially standing or walking; they cease entirely during sleep. Other disorders of motility, as tremor, chorea or athetosis, are frequently associated. The trunk and lower extremities are chiefly affected, especially their proximal segments. In the later stages there is often a well-marked tendency to stereotypy or fixation in the distribution of the spasm, which predominates in certain muscle groups. In this stage, there may be in the movements of the ankle, and less commonly of the wrist, a curious reversal of the normal manifestations of tonus which may be termed the paradoxical or reverse phenomenon of dystonia. When present it is pathognomonic. The affection varies considerably in the degree of motor unrest and agitation which is produced. This may occasionally assume sudden and violent proportions requiring strong sedatives and reducing the patient to a dangerous state of exhaustion. It may occasionally constitute an agitated form or stage of the disease. The affection is progressive and incurable and, with few exceptions, has appeared only in descendants of Russian and Polish Jews.

**Treatment of Congenital Syphilis.**—J. E. Smith (*Can. Med. Assoc. Jour.*, 1917, vii, 27) says that in congenital syphilis the prevention of cross-infection by means of the cubicle system is most important in order to reduce the mortality. This may be more efficiently accomplished outside by the supervision of all cases from a clinic, and the assistance of the visiting nurses. The greatest mortality is in the first six months so that early diagnosis and intensive treatment should be encouraged. Diarsenol offers the most efficient remedy from a therapeutic standpoint. The external jugular vein and the superior longitudinal sinus are the avenues by which the salt may be injected into the blood stream, so far without any untoward results.

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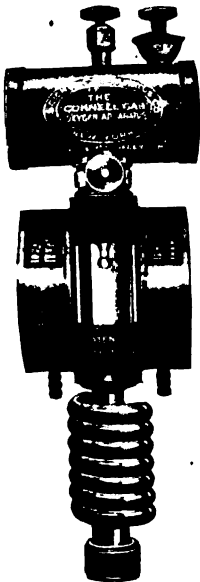
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